SONY

3-751-086-22 (2)

Video Camera Recorder Hi8

CCD-V5000

Operating Instructions

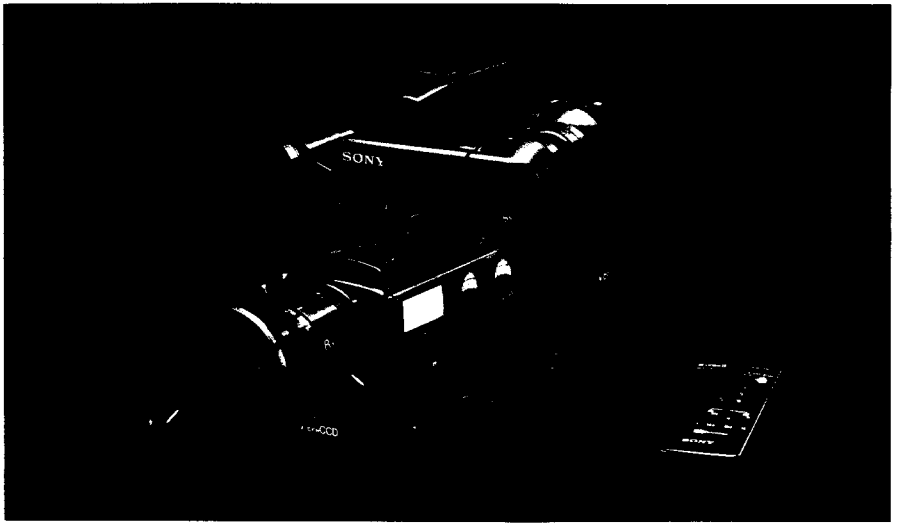
Before operating the unit, please read this manual thoroughly and retain it for future reference.

Mode d'emploi

Avant de mettre l'appareil en service, lire attentivement ce mode d'emploi et le conserver pour toute référence ultérieure.

Manual de instrucciones

Antes de utilizar la unidad, lea cuidadosamente este manual, y consérvelo para futuras referencias.



videoHi8 PRO

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English

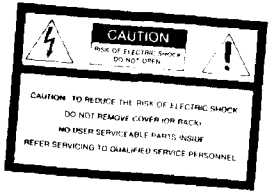
Owner's Record

The model and serial numbers are located on the bottom. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. CCD-V5000 Serial No. _ _ _ _ _ _ _

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

INFORMATION

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna

Relocate the equipment with respect to the receiver

Move the equipment away from the receiver

Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

For the customers in Canada

This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

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Introduction

Overview of the CCD-V5000

The CCD-V5000 is a compact color video camera/recorder (camcorder). You can use it to shoot the pictures you want and play them back on your television set. The camcorder works with 8 mm video format cassettes.

Who this Manual is for

This manual is designed for you, the videophile. You can use this manual to find exactly the information you need.

How the Manual is Organized

The manual includes shooting procedures that shows you how to use the features and function of your camcorder to get the effects you want. If you want to record right away, see p.38, 40 and 62. If you have a lot of familiarity with the camcorder, try to shoot picture with manual adjustments as well as automatic adjustments.

The manual also includes how to:

- record/play back the hi-fi and PCM stereo sounds by using the built-in stereo/narration microphone or external stereo/narration microphone.
- record/play back the digital picture with the various effects.
- play back a picture on TV.
- edit your original 8 mm tape onto another video tape.

If you have any problems during operation, see the trouble check section.

How the Manual Works

Use the information below to help you follow the instructions in this manual.

- The letter on an illustration corresponds to the letter in the text.
- The step numbers in an illustration correspond to the step numbers in the text.

Supplied Accessories

Your camcorder is packed with the following units. Check your package to see that everything is packed. (* Attached to the camcorder)

- Wireless Remote Commander (1)
- Size AA batteries (IEC designation R6) (2)
- Stereo earphone (1)
- Battery pack NP-77H (1)
- AC power adaptor AC-V50 (1)
- Lithium battery CR2025 (1)
- Cassette tape (1)
- Shoulder strap (1)
- Jack covers (1 set)
- Lens cap (1) *
- Card cleaner (1)
- RFU adaptor RFU-90UC (1)
- A/V connecting cord (3 phono to 3 phono) (1)
- Video cable with S video connectors (4-pin mini-DIN to 4-pin mini-DIN) (1)

Before You Begin

- For "once-only" events, it is strongly recommended to have a trial run to check that everything is working perfectly.
- Television programs, films, video tapes and other materials may be copyrighted. Unauthorized recording of such material may be contrary to the provisions of the copyright laws.
- For using the recorder abroad, see page 196.

This unit uses 8 mm video format cassettes. It records in the SP mode (approximately 1.43 cm/second) and can play back in the SP mode and the LP mode (approximately 0.72 cm/second). The quality of the playback picture in the LP mode, however, will not be as good as that in the SP mode.

Technical Information

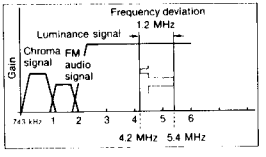
Hi8 (High Eight) Video System

The 8 mm video system employs a metal powder tape. This means the video camera recorder is capable of recording a large amount of information and enhances picture quality. Taking advantage of the 8 mm video system, the Hi8 video system has been developed. The main characteristics of the Hi8 video system are as follows:

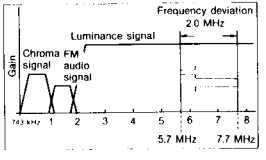
Super High Quality Picture

The information capacity is a key element for picture improvement. It can be increased by shifting up the FM carrier frequency range. In the Hi8 video system, the FM carrier frequency range of the luminance signal is shifted up to 5.7–7.7 MHz. This is higher than the 4.2–5.4 MHz range of the standard 8 mm video system. Thanks to this, the horizontal resolution is improved to more than 400 lines.

Frequency allocation of the standard 8 mm video system



Frequency allocation of the Hi8 video system



Technical Information

Use of High-Grade Tape Corresponding to the Hi8 Video System

Metal evaporated tape is ideal for video systems because it has large magnetic energy that allows for high-density recording. The Hi8 video camera recorder uses such high-grade tape for the Hi8 video system, covering a wide frequency range, to achieve a high-quality video signal for recording/playback.

S VIDEO (Separated Luminance/Chroma Signal) Input/Output Connectors

Conventionally, video equipment exchanges the composite video signal containing the luminance (Y) signal and the chrominance (C) signal mixed. The composite video signal is liable to produce interference resulting in picture quality loss. On the contrary, an S VIDEO connector transmits or receives the video signal separated into the luminance signal and the chroma signal. Flickers and color blur in the picture are minimized with the separated video signal, and sharpness is enhanced to such an extent that hair and fine stripes are clearly visible. The S VIDEO connector also assures an excellent editing quality with minimum picture quality loss.

Technical Information

Compatibility with Conventional Video Camera Recorders

A high-quality picture can be recorded and played back on a tape for the Hi8 video system.

Recording with this unit

Hi8 tape

- Hi8 mode switch to AUTO → Tape recorded in the Hi8 video system
- Hi8 mode switch to OFF → Tape recorded in the standard 8mm video system

Standard 8 mm tape

- Regardless of the position of the Hi8 mode switch → The recorded in the standard 8mm video system

Playback with this unit

- Tape recorded in the Hi8 video system
- Tape recorded in the standard 8 mm video system

→ The recording mode is selected automatically

- A tape recorded in the Hi8 video system cannot be played back with an conventional 8mm video camera recorder.
- A standard 8mm tape cannot be recorded in the Hi8 video system.
- A tape for the Hi8 video system cannot be recorded and played back in the Hi8 video system with a conventional video camera recorder.
- The recording tape speeds in the Hi8 video system are compatible with the conventional 8 mm format.
  Recording/playback time is 2 hours using a E6-120/P6-120 tape or the equivalent.

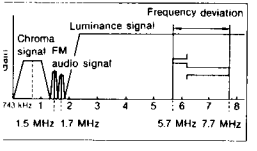
Cassette used	With this unit		
	Recording		Playback
	Hi8	Normal	
Standard 8 mm tape	No	Yes	Yes
Hi8 tape	Yes	Yes	Yes

Technical Information

Hi-Fi Stereo System

n the 8mm video standard track the sound is corded/played back in AFM hi-fi monaural. e PCM digital stereo sound is corded/played back on the PCM track as an xtion.
n this unit, in addition to PCM digital stereo und, the AFM hi-fi stereo sound can be corded on the standard track.
o maintain compatibility with the conventional FM hi-fi monaural sound, the AFM hi-fi stereo ound is recorded as the L−R sound using the 7 MHz carrier and the L+R sound using the 5 MHz carrier as the FM audio signal.
o play back the tape recorded by its hi-fi ereo system, this unit uses a matrix circuit to oduce the L and R stereo sounds separately. hen a conventional AFM hi-fi monaural stem model is used to play back a tape corded in AFM hi-fi stereo, it will produce the +R monaural sound because the monaural odel can reproduce only the 1.5 MHz carrier. ie AFM hi-fi stereo system of this unit allows ou to enjoy a live stereo sound atmosphere ven with the standard track.

equency allocation of the hi-fi stereo system



ompatibility with conventional 8mm video rmat

hen you play back an AFM stereo hi-fi corded tape with a conventional 8 mm video quipment, a sound is reproduced in monaural.

TBC (Time Base Corrector)

During playback, the TBC is automatically turned on to reduce jitter and further enhance the high quality of the picture recorded in the Hi8 video system.

On Jitter

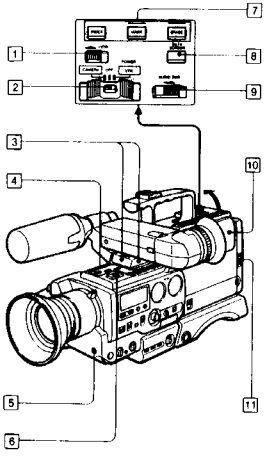
A signal recorded on the tape is demodulated to its original video signal through the rotating magnetic head. During this process, time base fluctuations due to uneven rotation of the head and varying tape running speed are added to the demodulated video signal. These time base fluctuations that occur with video equipment are called jitter. As long as the monitor can scan the fluctuation, no effect is produced on the image. However, when the jitter exceeds a certain limit, the image becomes unstable and a swaying motion or bend is produced on the monitor. For the Hi8 video system, particularly with its more than 400 lines of horizontal resolution and precise reproduction of the fine vertical lines, eliminating jitter will contribute greatly to further enhancing the picture quality.

Basic Principles of TBC

The write clock based on the synchronized signal (H. V) separated from the video signal temporarily writes the video signal with jitter to the field memory which the digital TBC uses. The stable read clock reads the signal data one by one in the order in which they were written in memory, and produces the video signal output without the jitter.

When you repeat editing over and over, jitter accumulates and might corrupt the synchronized signal, thus causing the image to bend. The digital TBC with its field memory produces the synchronized signal output separately from the video signal after rewriting it into a stable one. Therefore, if you use this unit as the playback machine during editing for the purpose of reducing jitter, it will be effective in removing the image bend that occurs due to corruption of the synchronized signal. The TBC also reduces jitter caused by incompatibility (jitter which occurs when the recording machine and playback machine are of a different make). This unit is therefore highly suitable for use as the master unit.

A-1



Location and Function of Parts and Controls

For details on the use of each control, refer to the pages indicated in the circle.

A-1

1 **+ VTR switch** ●, ●
During recording, to operate the buttons for the VCR, slide in the direction of the arrow.

2 **POWER switch**
CAMERA: For camera recording
VTR: For playing back or editing tapes
OFF: Power off

3 **Remote control detector** ●

4 **Digital picture buttons** ●
Press to make the digital pictures.
DIGITAL ZOOM button
P in S button
FADER/OVERLAP button
PICTURE button

5 **INDEX MARK button** ●
Press to mark the index signal **during recording.**

6 **EDITSEARCH button** ●, ●, ●

7 **INDEX buttons** ●
INDEX: Press to search the index signal marked.
MARK: Press to mark the index signal.
ERASE: Press to clear the index signal.

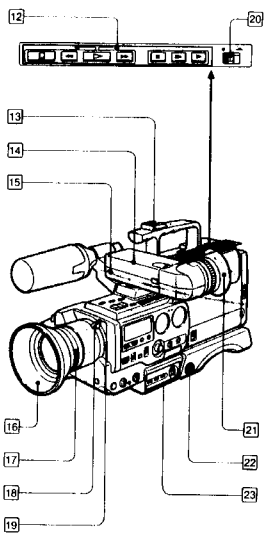
8 **DATA SCREEN button** ●
Press to display the indication on the viewfinder screen on the TV.

9 **AUDIO DUB (dubbing) button** ●
Slide to dub the audio signals.

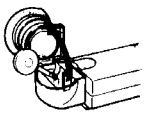
10 **Speaker** ●
During recording or playback, the monaural sound will be monitored.

11 **BATT (battery eject) knob** ●

A-2



A-3



A-2

12 **Tape transport buttons**
□ (stop), ◀◀ REW (rewind), ▷ (playback), ▶▶ FF (fast forward), ❚❚ (pause), ❚❚▶ FRAME (frame-by-frame playback), ❚▶ SLOW (slow speed playback)

13 **Accessory shoe**
Attach a video light, etc.

14 **Viewfinder**
The picture being recorded or played back can be monitored in monochrome here. Also, data such as caution indicators and function mode are displayed on the viewfinder screen.

15 **Camera recording/battery/tape end lamp**
Lights during camera recording. It blinks when the battery is exhausted or the tape is at its end.

16 **Lens hood**

17 **Focus ring** ●

18 **Zoom lever** ●

19 **Macro set button** ●

20 ● **REC (recording) switch**
Slide in the direction of the arrow.

21 **Eyecup**

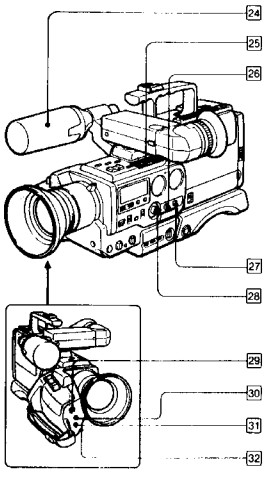
22 **PUSH SLIDE button** ●
While pressing this button, adjust the position of the shoulder mount.

23 **Digital picture buttons** ●
Press to make the digital pictures.
STROBE button
SOLARIZATION button
NR (noise reduction) button
EFFECT LEVEL control

A-3

To remove dust from inside the viewfinder
Open the eyecup and remove the dust with a blower.

A-4



A-4

24 One point stereo microphone
Select the appropriate function according to the shooting conditions.

25 SUPERIMPOSE buttons ⊕
Used to record the title.
TITLE 1 button
TITLE 2 button
MEMORY button
COLOR/MODE button

26 BALANCE control ●
The left/right channel balance of the microphone or input signal from the AUDIO INPUT jack can be adjusted.

27 MIC switch ● ⊕
AUTO: Normally set to this position.
MANU: Set to adjust the volume or left/right channel balance of the microphone or input signal from the AUDIO INPUT jack.

28 REC LEVEL control ●
The volume of the microphone or input signal from the AUDIO INPUT jack can be adjusted.
Normally set to the green position.

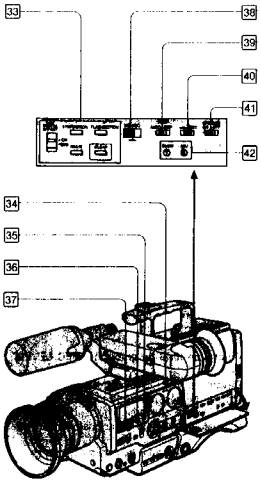
29 START/STOP button ●
Used for low position recording.

30 NAR. MIC (narration microphone) jack (mini jack) ●
Connect an external narration microphone.

31 PHONES jack (stereo mini jack) ●
Connect the supplied earphone.

32 PHONE LEVEL control ●
During playback, the sound level of the speaker or connected ear receiver can be adjusted.

A-5



A-5

33 Digital picture buttons ⊕
Press to make the digital pictures.
DIGITAL EFFECT switch
STOPMOTION button
FLASHMOTION button
MULTI button
CLEAR button

34 LEVEL METERs and indicator ●

35 ZERO MEM (zero memory) button ⊕
Used to memorize the counter zero point.

36 COUNTER RESET button ⊕
Press to reset the counter to zero.

37 DATE and TIME buttons ●
Press to display or turn off the date or time.

38 INT. REC (interval recording) button ●
Slide to activate the automatic interval recording function.
The picture can be recorded for approximately one second every one minute.

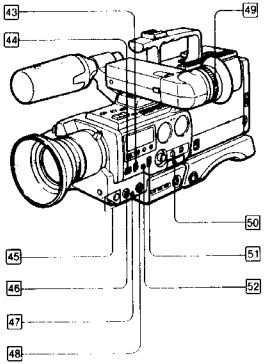
39 Hi8 (high eight) mode switch ●
When set to the AUTO (green mark) position, the recording mode will be selected automatically according to the tape to be used.

40 EDIT switch ⊕
Normally set it to the OFF position. When editing tapes, set in the direction of the arrow (ON).

41 SPEAKER switch ●
During recording or playback, set to ON to monitor the sound.

42 SLOW ADJ (adjustment) buttons ⊕

A-6



A-6

43 FOCUS switch ●
Used for manual focusing.

44 AUTO LOCK switch ●, ●
Normally set to the upper AUTO LOCK position (green mark).
To adjust the focus, white balance, iris, sensitivity or shutter speed manually, set to the lower position (white mark).

45 IRIS control ●
Normally set to the center position (green mark).

46 WHT BAL (white balance) control ●
Used for manual white balance adjustment.

47 (one push white balance) button ●
Press to adjust the white balance presicely.

48 SHUTTER SPEED button ●
Used to select the shutter speed.

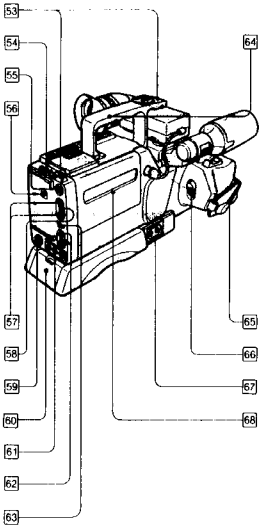
49 Viewfinder lens adjustment ring ●
Adjust to your eyesight to assure good focus. Be sure to adjust this ring when shooting for the first time.

50 NARRATION MIC button ●
Press to record your narration. When the PUSH mark is pressed, the microphone will be out.

51 SENS (sensitivity) switch ●
Set to HIGH or S-HIGH when the scene to be recorded is too dark.

52 PUSH AUTO button ●
While recording with manual focusing, to set the unit into automatic focusing momentarily, press this button.

A-7



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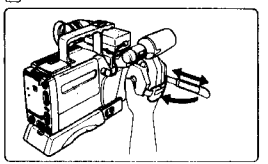


A-7

53 Hooks for shoulder strap ●
Attach a shoulder strap.

54 EJECT (Cassette eject) button ●

55 S VIDEO OUTPUT connector (4-pin mini-DIN) ●, ●

56 DC IN connector

57 VIDEO/AUDIO OUT (output) jacks (phono jacks) ●

58 RFU DC OUT (RFU adaptor DC output) jack (special minijack) ●, ●
Supplies power to the RFU adaptor.

59 S VIDEO INPUT connector (4-pin mini-DIN) ●, ●

60 Utility compartment
Insert the earphone, etc.

61 VIDEO/AUDIO INPUT jacks (phono jacks) ●, ●

62 AUDIO OUTPUT jacks (phono jacks) ●, ●

63 AUDIO MONITOR switch ●
Selects the sound to be monitored during playback.

64 Carring handle

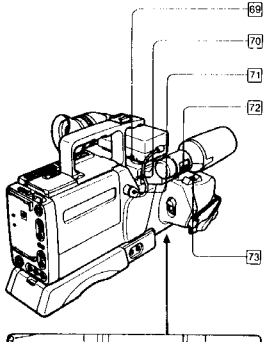
65 Grip strap
Adjust the length so that your thumb can easily manipulate the START/STOP button.

66 STANDBY switch ●
Slide up to set the unit to recording pause mode.

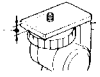
67 MIC (external microphone) jacks (phone jacks) ●, ●

68 Cassette holder

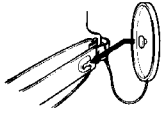
A-8



A-9



A-10



A-8

69 **PUSH SLIDE button** ●
Press to adjust the position of the viewfinder.

70 **REMOTE** ⏎ **connector**

71 **VIEWFINDER connector** ●

72 **MIC (microphone) SELECT switch** ●
Normally set to the left (green mark) position.

73 **Variable power zoom button** ⊛

74 **Tripod receptacle**

75 **Lithium battery compartment** ●

76 **Hi-fi sound output select switch** ⊛

A-9

Note when attaching a tripod not manufactured by Sony
When attaching a tripod not manufactured by Sony, the length of the camera mounting screw must be less than 6.5 mm. Otherwise the screw may damage the inner parts of the camera.

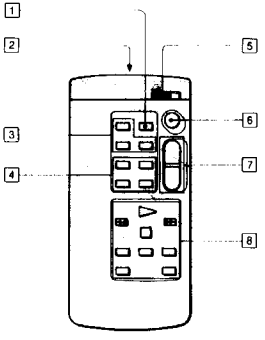
A-10

When the lens cap is removed
Attach the lens cap to the grip strap.

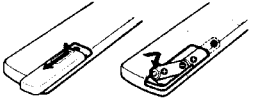
About the ⏎ mark
⏎ means the LANC connector.
LANC stands for Local Application Control Bus System. The LANC connector is used for controlling the tape transport of video equipment and peripherals connected to it. This connector has the same function as the connectors indicated as CONTROL L or REMOTE.

Remote Commander A-11

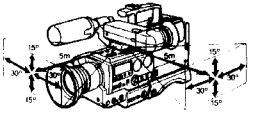
A-11



A-12



A-13



The buttons on the commander have the same function as the buttons on the recorder with the similar name or mark.

1 **DATA SCREEN button** ⊛

2 **Transmitter**

3 **INDEX buttons** ⊛
INDEX button
MARK button
ERASE button

4 **Digital picture buttons** ⊛
Press to make the digital pictures.
MULTI button
ZOOM button
FLASH MOTION button
CLEAR button

5 **HOLD button**
To avoid miss operation, set in the direction of the arrow.

6 **START/STOP button**

7 **Power zoom button** ⊛
The size of the subject in the scene can be changed.
The zooming speed cannot be changed with this button.

8 **Tape transport buttons**
◀◀ **REW** button, ▷ **PLAY** button, ▶▶ **FF** button, □ **STOP** button, ● **REC** button, **PAUSE** button, **FRAME** button, **SLOW** button

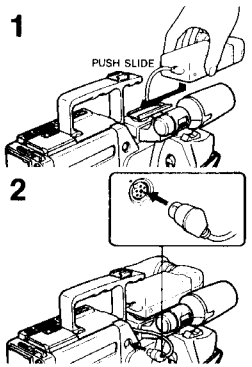
Installing the batteries A-12
Insert two size AA (R6) batteries with correct polarity.

Operation range A-13

Notes on the handling of batteries
- With normal operation, the batteries will last for approximately six months.
- If the Commander will not be used for a long period of time, remove the batteries to avoid possible damage from battery leakage.

Attaching the viewfinder and the shoulder strap

B-1

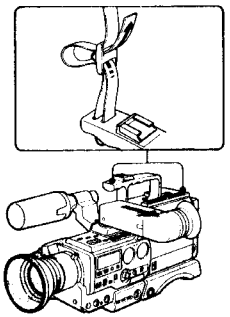


Attaching the viewfinder

Before using the video camera recorder, attach the viewfinder. B-1

1 While pressing the PUSH SLIDE button, slide the viewfinder completely on the guide rail.
Move the viewfinder frontward or backward a little until it locks.
2 Align the projection of the plug with the groove of the connector and connect the viewfinder cable to the viewfinder connector.

B-2



Attaching the shoulder strap

Slide the viewfinder as illustrated and then thread the shoulder strap. B-2

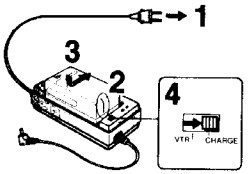
Connecting the Power Sources

First, Choose the Power Source

Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-77H or NP-77
Indoors	House Current	AC power adaptor AC-V50

Note on power sources
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape.
If this is done by accident, supply the power again immediately and turn on the power switch.

C-1



Using the Battery Pack

Step1 : Charge the battery pack. C-1

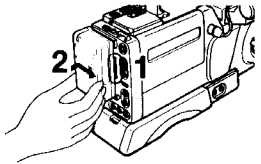
1 Connect the AC power adaptor to a wall outlet.
2 Align the grooves on the battery pack with those on the AC power adaptor.
3 Slide in the battery pack to the right, as illustrated.
4 Set the mode selector to CHARGE.
5 Charge the battery for:

	NP-77H	NP-77
Required charging time	140	120

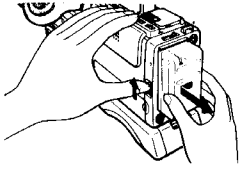
(approx. minutes)

See the instruction manual of the AC power adaptor for details.

C-2



C-3



C-4

C-5

Step2 : **Mount the battery pack on the camcorder** C-2

1 Align the right side of the battery pack with the white line on the recorder.
2 Slide in the battery pack to the right.
Note: Make sure the battery fits completely on the mounting surface of the recorder. Imperfect fit may damage the projections on the recorder.

To remove the battery pack C-3
Slide BATT up, and at the same time, slide out the battery pack to the left.

Battery life
A fully charged battery pack lasts for:

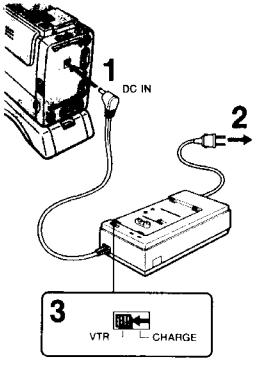
	When the DIGITAL EFFECT switch is set to OFF.		When the DIGITAL EFFECT switch is set to ON.	
Battery life	NP-77H	NP-77	NP-77H	NP-77
	50	40	40	30

(approx. minutes)

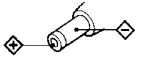
When the battery becomes weak, the indication and red lamp will blink in the viewfinder. C-4
Replace the battery pack with a fully charged one.
- An NP-55 cannot be used for this unit because the battery life of the NP-55 is too short.

How to use the switch on the battery pack C-5
This switch is provided to show you the charging condition. Set the switch to the "no mark" position when the charging is completed. Set the switch to the "red mark" position when the battery is used up.

C-6



C-7

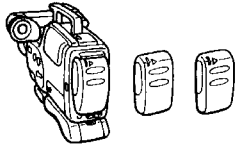


Using the AC Power Adaptor C-6

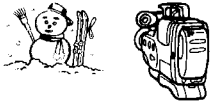
1 Connect the DC output plug of the AC power adaptor to the DC IN jack of the recorder.
2 Connect the AC power adaptor to a wall outlet.
3 Set the mode selector to VTR.
See the instruction manual of the AC power adaptor for details.

Note C-7
Use only the AC-V50 AC power adaptor (supplied).
Do not use any other AC power adaptor.
Polarity of the plug is shown in the illustration.

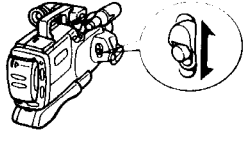
D-1



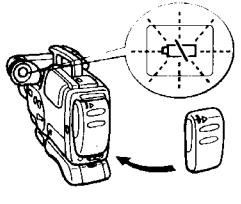
D-2



D-3



D-4



Use of the Battery Pack

How to Prepare the Rechargeable Battery Pack

Have sufficient battery pack power to do 2 or 3 times as much recording as is planned. D-1
"Battery life" as described in the instruction manual or catalogue of the video camera recorder is measured by the continuous recording time of the camera, placed in a normal temperature using a fully-charged battery. When the DIGITAL EFFECT switch is set to ON, battery life will be shorter.

Battery life is shorter in a cold climate. D-2
Battery efficiency is decreased and battery life runs out more quickly.

While recording, turn the STANDBY switch of the camera on and off frequently. The battery life becomes longer. D-3
A smooth recording can be made even if recording is stopped and started again.
While positioning the subject or selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is being expended. The battery is also being expended when a cassette is inserted or removed.

When the Rechargeable Battery Pack Should be Replaced

While recording, when the mark ⌓ seen in the viewfinder changes to rapid blinking from slow blinking. D-4
Turn off the POWER switch of the camera and replace the battery pack. Leave the cassette in the camera in order to obtain a smooth recording after the battery pack is replaced.

D-5

Notes on Charging

Before using the battery pack, charge it sufficiently. The Sony rechargeable battery pack is placed on the market without having been charged. D-5

Recharge the battery pack when it is exhausted.
- If recording is completed before the mark ⌓ appears in the viewfinder, it is recommended to eject the cassette, set the POWER switch to CAMERA and slide up the STANDBY switch until the mark ⌓ in the viewfinder blinks rapidly.
- Repeated charging while some capacity remains causes a lowering of battery capacity.

Recharge the battery pack before using if possible.

Keep the Terminals Clean

If the terminals are not clean, the battery duration will be shortened.
When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact condition.
Also, wipe the ⊕ and ⊖ terminals with a soft cloth or paper.

Notes on Rechargeable Battery Pack

Why the battery pack heats up

During charging or recording, the battery pack heats up. This means that electric energy has been generated and that chemical change has occurred inside the battery pack. This is not dangerous.

How to care for the battery pack

- Remove the battery pack from the video camera recorder after using it, and keep it in a cool place.
  When the battery pack is in the video camera recorder, an infinitesimal amount of current flows to the recorder even if the POWER switch is turned off. It causes overdischarging and shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus, it is recommended you charge the battery just before using.

How many times can the battery pack be recharged

It can be fully charged and discharged about 300 times in normal temperature.
If the battery mark blinks rapidly just after turning on the video camera recorder with a fully-charged battery pack, the battery pack should be replaced with a new fully-charged one.

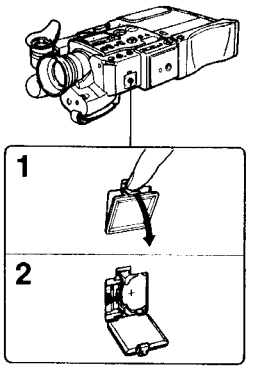
Temperatures during charging

Lower temperatures require a longer charging time.
Charging in temperatures ranging from 10°C to 30°C (50°F – 85°F) is recommended.

Carry the battery pack in a case.

Do not carry an uncovered battery pack. If the + and – terminals of the battery pack are shortened by a piece of metal, the battery will be heated abnormally. This is very dangerous. Never put an uncovered battery pack in a pocket with a key holder, etc.

D-6



D-7

Lithium Battery D-6

To insert the lithium battery

This unit uses a lithium battery to activate the clock and to keep titles in memory. Before operating the unit for the first time, install the supplied lithium battery.

1 Open the cover of the lithium battery compartment on the bottom.
2 Install the supplied CR2025 lithium battery with the ⊕ side facing out.
3 Close the cover.

To remove the lithium battery D-7

Press the side of the battery in the direction indicated for installation.

Lithium battery life

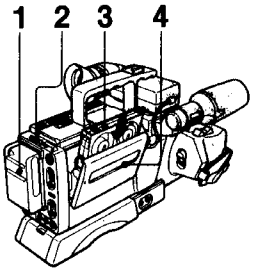
Approximately 1 year in normal operation. When the lithium battery becomes weak, the numbers blink in the display window and the time indication will blink on the viewfinder screen for about 5 seconds.
In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of another battery may present a risk of fire or explosion.**
After replacing the battery, readjust the date, time and titles. (If the battery is replaced with the battery pack attached, the readjustments are not necesary.)

Notes on lithium battery

- Keep the lithium battery out of the reach of children.
  Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.
- When the battery pack is not attached, even if the lithium battery is installed, the indications in the display window will not light up.

WARNING
Battery may explode if mistreated.
Do not recharge, disassemble or dispose it in fire.

E-1



E-2

Inserting a Cassette

Cassette Insertion E-1

1 Connect a power source.
2 Press and slide the EJECT button.
3 Insert a cassette with the window facing outside.
4 Press the cassette holder to close it.

Cassette Ejection

1 Make sure that a power source is connected.
2 Press and slide the EJECT button.
3 Take out the cassette and press the cassette holder to close it.

To Prevent Accidental Erasure

Slide out the tab on the cassette so that it covers the opening. (A red mark will appear.) E-2

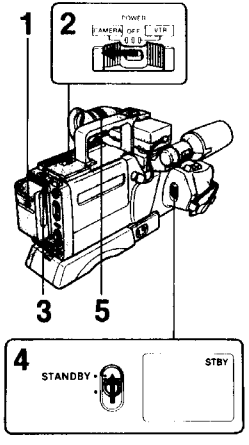
To re-record on the cassette, slide the tab in to uncover the opening.

Notes

- Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the kind of tape, thickness of tape, or if the tab is out or in, etc.
- To record from the beginning of the tape, run the video camera recorder for about 15 seconds at the beginning of a cassette before recording. It will avoid missing the starting point during playback on a video cassette recorder.

Adjustment of the Viewfinder Lens

E-3



The position of the viewfinder lens for optimum vision varies depending on the person. E-3

1 Connect a power source.
2 While pressing the small button, set the POWER switch to CAMERA.
3 Insert a cassette.
4 Slide the STANDBY switch up.
5 Turn the viewfinder lens adjustment ring so that the indicator displayed on the viewfinder screen comes into sharp focus.

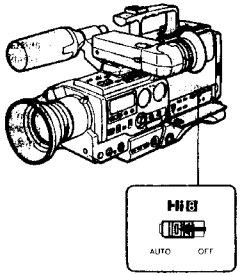
Adjustment of the viewfinder lens is necessary only for your initial use, or for use after someone else.

Note
If you leave the unit in the recording pause mode for 5 minutes or more, the unit will be automatically turned off. To resume recording pause mode, slide the STANDBY switch down once and slide it up again. To start recording, press the START/STOP button.

Selection of the Automatic and Manual Adjustments

Function of the Hi8 Mode Switch

E-5



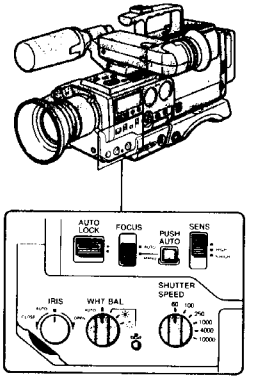
When the Hi8 mode switch is set to AUTO, the recording mode is selected automatically.
- For Hi8 video system tape: Hi8 mode recording
- For standard 8mm tape: Normal mode recording

When a tape for the Hi8 video system is used for normal recording, set the Hi8 mode switch to OFF. E-5

Selection of the Automatic and Manual Adjustments

Function of the AUTO LOCK Switch

E-4



When the AUTO LOCK switch is set to AUTO LOCK (green mark), the iris, focus, white balance, sensitivity and shutter speed (1/60) are adjusted automatically. But under certain circumstances, such as the white balance adjustment, manual adjustment is better for effective recording. E-4

When the AUTO LOCK switch is set to the lower position (white mark), each manual function works as follows.

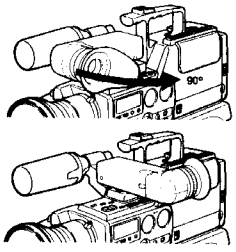
FOCUS See page 90.	For manual focusing, set to MANU.
PUSH AUTO See page 94.	When this button is kept depressed, auto focusing activates in the manual focusing mode.
WHT BAL See page 96.	According to the condition in which the recorder is used, set to ☀ or ☁.
WHT BAL See page 98.	When the WHT BAL is set to and the button is pressed, the white balance is adjusted manually.
SENS See page 102.	Set to HIGH or S-HIGH to get high sensitivity.
IRIS See page 100.	• When the shooting subject is too dark, turn to OPEN. • When the shooting subject is too bright, turn to CLOSE.
SHUTTER SPEED See page 104.	Set this according to the shooting subject.

Even if the AUTO LOCK switch is set to the lower position, if each control is set to AUTO, it auto function will work. It is convenient to use some functions in manual mode and others in automatic mode.

Easy Camera Recording with Automatic Adjustment

Holding the Video Camera Recorder

F-1



Setting of the viewfinder F-1
Turn the viewfinder until it locks (90 degrees).

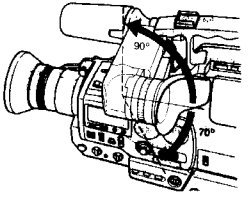
Basic posture for recording F-2
Put the video camera recorder on your shoulder and your right elbow firmly against your side.

For low position recording F-3
1 Turn up the viewfinder.
2 Press the START/STOP button at the side of the lens.

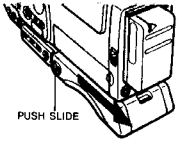
F-2

F-3

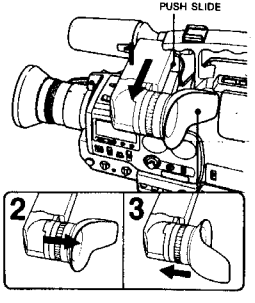
F-4



F-5



F-6

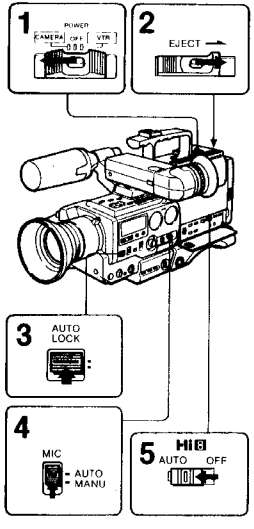


To change the angle of the viewfinder F-4
The viewfinder can be turned 90 degrees up and 70 degrees down to make high-angle or low angle shooting possible.

To adjust the position of the shoulder mount F-5
While pressing the PUSH SLIDE button, slide the shoulder mount backward. The shoulder mount can be set to one of two positions.

To view with your left eye F-6
1 While pressing the PUSH SLIDE button, slide the viewfinder. The viewfinder can be set to one of two positions.
2 Pull out the rubber eyecup.
3 Turn the eyecup and reattach it.

F-7



Easy Camera Recording with Automatic Adjustment

How to Record

F-7

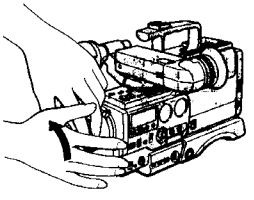
1 While pressing the small button, set the POWER switch to CAMERA.
2 Insert the cassette.
3 Set the AUTO LOCK switch to AUTO LOCK (green position).
For manual adjustment, see pages 90 to 108.
To adjust the white balance precisely, we recommend the manual white balance adjustment with the white lens cap.
4 Set the MIC switch to AUTO.
5 Set the Hi8 mode switch to AUTO (green mark).
6 Slide the STANDBY switch up.
The unit will enter the recording pause mode.
7 Press the START/STOP button.
Recording will start.

For digital picture recording, see "Viewing digital picture" on page 136.

Check on the viewfinder screen
STBY: Displayed during recording pause mode.
REC: Displayed during recording.

To stop recording
Press the START/STOP button again.
The unit will enter the recording pause mode.
Avoid rough handling or mechaniical shock to the unit. A smooth transition between scenes may not be made.

F-8



To check the last portion of the previous recording
1 Set the recorder in recording pause mode by pressing the START/STOP button.
2 Press the – ⏮ EDITSEARCH button momentarily.
The last few seconds of the recorded portion are rewound and then the recorded picture is monitored on the viewfinder screen. The unitt then enters the recording pause mode.

If the picture has not been recorded
The video heads may be contaminated. Clean the heads using the Sony video head cleaning cassette.

After using
Slide the STANDBY switch down and set the POWER switch to OFF. (You need not press the center button when setting the switch to OFF.)

When attaching the lens hood, filter or conversion lens, hold the focus ring.

When removing, press it with the palm of your hand and turn it counterclokwise. F-8

Note on power source
If the POWER switch is moved during recording, the tape will stop.

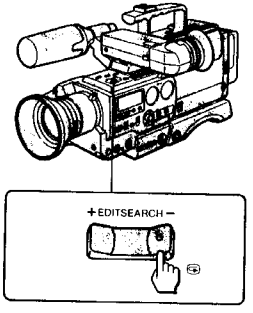
The last portion of the recorded picture appears momentarily when the recording is started.
This is a phenomenon of the overlap operation (page 142).

Brightness Levels

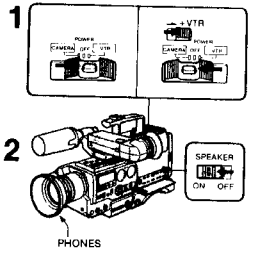
The single greatest influence on picture quality is the brightness level. Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording.

	Unit: lux	
Snow-covered mountains Snow fields Sandy beach, clear day in summer		ND filter required
Clear day, mid-day (100,000) Clear day, mid-afternoon (35,000) Overcast day, mid-day (32,000)	100,000	
	10,000	
Overcast day, one hour after sunrise (2,000) Office lit by fluorescent lamps, near window (1,000) Clear day, one hour before sunset (1,000)	1,000	
Department store counter (500 - 700) Station wicket (550)	500	Normal Recording
Office lit by fluorescent lamps (400 - 500) Room lit by two 30 W fluorescent lamps (300) Subway station platform (300)	300	
Arcade at night (150 - 200)	100	
Theater lobby (15 - 35) Candlelight (10 - 15)	10	Video light recommended

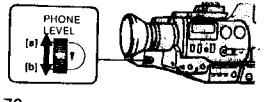
F-9



F-10



F-11



Instant Playback on the Spot F-9

You can monitor the picture just recorded on the viewfinder screen.

1 While pressing the small button, set the POWER switch to CAMERA.
2 Slide the STANDBY switch up.
3 Press the "−" side of the EDITSEARCH button to view the playback picture in reverse.
4 Press the "+" side of the EDITSEARCH button to view the playback picture.

To Monitor the Playback Sound F-10

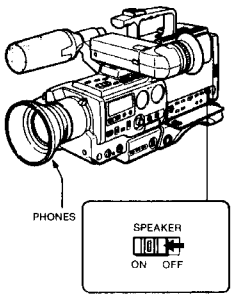
1 While pressing the small button, set the POWER switch to VTR. If the POWER switch is set to CAMERA, set the +VTR switch in the direction of the arrow.
2 Set the SPEAKER switch to ON.
3 Rewind the tape.
4 Playback the tape.

To stop the tape, press the ■ button.

To monitor the sound with the earphone
Connect the earphone to the PHONES jack. When the earphone is connected, even if the SPEAKER switch is set to ON, the sound from the speaker will be turned off.

To adjust the volume of the speaker or earphone F-11
Turn the PHONE LEVEL control.
[a] To increase the volume
[b] To decrease the volume

F-12



To Monitor the Sound during Recording

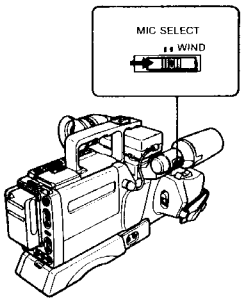
To monitor with the speaker: F-12
Set the SPEAKER switch to ON.
The sound level cannot be adjusted in the recording mode by using the PHONE LEVEL control.

To monitor with the earphone: F-12
Connect the earphone to the PHONES jack on the side of the lens.
When the earphone is connected, the speaker sounds will be turned off. The volume can be adjusted with the PHONE LEVEL control.

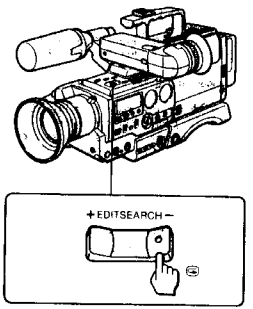
To Cut Wind Noise

Set the MIC SELECT switch to WIND to cut the low frequency noise, like wind noise etc.
F-13

F-13



F-14



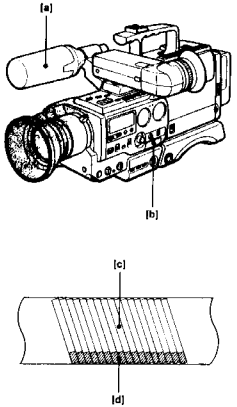
During Recording, to Record Again on the Previous Recorded Portion (Editsearch 1) F-14

1 Slide the STANDBY switch up.
2 Monitor the picture on the viewfinder screen and locate the point from which the recording is to begin again with the EDITSEARCH button.
Press the "+" side of the EDITSEARCH button to advance the picture at a normal playback speed, or the "−" side to reverse the picture.
3 At the desired point, release the EDITSEARCH button.
The unit will be set to recording pause mode.
4 Press the START/STOP button to start recording.

Smooth recording can be made even if the recording is stopped and started again, or even if the power is turned off and on again, provided that the cassette is not removed. But, if the cassette has been removed, proceed as above.

Audio Recording

G-1



There are two kinds of built-in microphones, one-point stereo microphone and narration microphone.
The one-point stereo microphone is a uni-directional type. The sharp directivity allows recording of the sound from the subject itself and its surroundings with natural sound quality.
The narration microphone is to be used for telling the event during recording.
The sounds from the one point stereo microphone can be recorded in stereo on the standard track and the PCM track, and the sounds from the narration microphone can be recorded in monaural on the standard track.

An external stereo microphone and external narration microphone can be connected to this unit, also.
For details on the recording tracks where the sounds from each microphone are recorded, see the table below.

When the built-in microphone is used, the audio signal is recorded as follows. G-1
[a] One point stereo microphone
[b] Narration microphone
[c] Standard track (Hi-fi stereo recording)
[d] PCM track (digital stereo recording)

Sound to be recorded / Microphone to be used	Standard track		PCM track	
	L channel	R channel	L channel	R channel
One-point stereo microphone	L sound	R sound	L sound	R sound
When the narration microphone is set to ON.	L sound and narration (monaural)	R sound and narration (monaural)	L sound	R sound

When an external microphone is connected, the audio signal is recorded as follows.
The sound from the external microphone can be recorded in stereo on the standard track and the PCM track. When the built-in narration microphone is used with the external microphone, the sounds from both microphones are mixed on the standard track.

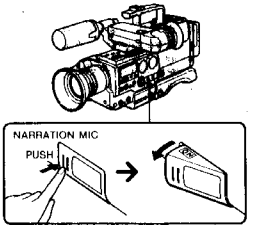
Sound to be recorded / Connection	Standard track		PCM track	
	L channel	R channel	L channel	R channel
L and R	external L microphone	external R microphone	external L microphone	external R microphone
L	external L microphone	external L microphone	external L microphone	external L microphone
R	built-in L microphone	external R microphone	built-in L microphone	external R microphone

When the external narration microphone is used
The sound from the external narration microphone can be recorded in monaural on the standard track. The Hi-Fi lamp will be turned off (page 86).
When the built-in stereo microphone or the external stereo microphone is used with the external narration microphone, the sound from the stereo microphone can be recorded on the PCM track.

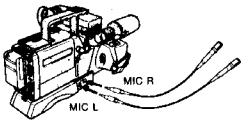
Use of the One Point Stereo Microphone

Normally set the MIC switch to AUTO and the recording level will be adjusted automatically. However, according to the recording condition or subject, more effective recording can be done by manual adjustment. See "Recording level adjustment" on page 86.
When there is strong wind, set the MIC SELECT switch to WIND. The effects of wind noise will be reduced.

G-2



G-3



Use of the Built-in Narration Microphone G-2

During recording, the narration can be recorded. Press the PUSH mark on the NARRATION MIC.
While recording the narration, the sound from the one-point stereo microphone can be recorded on the standard track and the PCM track.
While recording with the POWER switch set to VTR, the narration can be recorded.

After using, push in the microphone.
The narration microphone will be turned off automatically.

Use of an External Stereo Microphone G-3

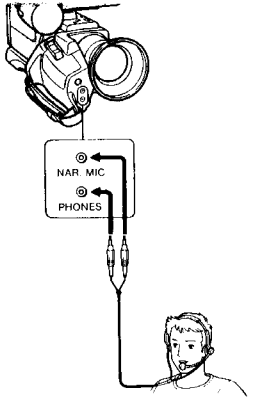
Connection example
Connect each microphone to the MIC L and R jacks.
When one microphone is connected, for the track where the sound from the built-in or external microphone is recorded, see the table on page 80.

Variety of optional microphones
- To pick up specific sounds
  — uni-directional microphone
- To isolate a sound
  — supercardioid microphone
- To allow the field of recording to be changed
  — zoom microphone
- To pick up sounds equally from all directions
  — omni-directional microphone

Adjustment of the recording level
See the "Recording level adjustment" on page 86.

Note
Keep the microphone far away from the TV so that the hum noise does not occur.

G-4



Use of an External Narration Microphone G-4

When a stereo headphone equipped with the microphone is used, the narration can be dubbed during monitoring the recording sound.

When the external narration microphone is connected

- The built-in narration microphone will not be functioned.
- The sounds from only the external narration microphone can be recorded in monaural on the standard track.

When the sounds are played back by the VCR without the PCM recording or playback function.

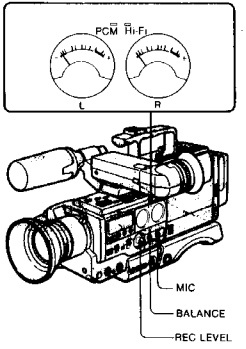
The sounds from only the external narration microphone will be played back.

Adjustment of the recording level

See the "Recording level adjustment" on page 86.

Recording Level Adjustment

G-5



When the MIC switch is set to the green (upper) position, the recording level of the microphone will be adjusted automatically. However, for the audio dubbing or the tape editing, the manual adjustment is recommended. G-5

Volume adjustment G-6

1 Set the MIC switch to MANU.
2 Adjust the volume.
Turn the REC LEVEL control so that the meter sometimes enter into the red zone.

Balance adjustment G-7

1 Set the MIC switch to MANU.
2 Turn the BALANCE control to adjust the balance.
To increase the volume of the right channel
— Turn towards the R side.
To increase the volume of the left channel
— Turn towards the L side.

Order of the adjustments

First adjust the volume and then balance.

Reading the level meter

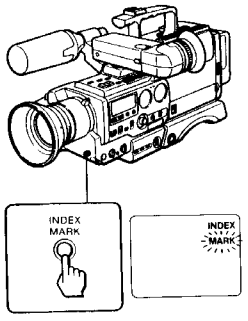
- If the meter swings into the red zone, the recorded sound is distorted.
- If the meter hardly swings at the left position, recording will be noisy.

G-6

G-7

To Mark Index Signals during Recording

G-8



The desired program can be easily located by an index signal marked on the tape.
Press the INDEX MARK button at any desired point on the tape during camera recording. G-8

When the index signal is marked in the recording pause mode (the MARK indication blinks), the index signal will be marked just after the recording pause mode is released.

For other index operations, see page 164.

Notes

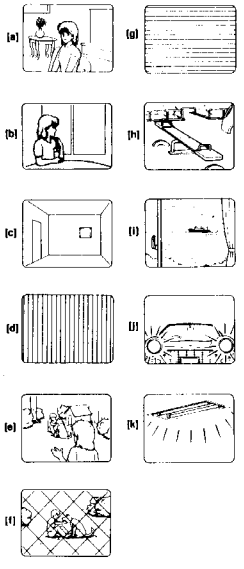
- The index signals can be marked at any desired point. But make sure there is more than 2 minutes of space between two index signals. If there is more than one index signal marked within an interval of 2 minutes on a normal tape run, the unit may not function properly.
- The INDEX MARK indication disappears automatically.
  Continue to record until the INDEX MARK disappears so that the recorded index signal can be searched correctly in the playback mode.

When the POWER switch is set to VTR, the index signal can also be marked during recording.
If the REC switch is pressed to start recording in the stop mode, an index signal will be automatically marked at the beginning of the tape.

Manual Focusing

Use manual focusing when shooting subjects difficult to focus automatically.

G-9



Poor Conditions for Auto Focusing G-9

- [a] Insufficient light
- [b] Too much bright light behind the subject
- [c] Subjects with flat colors and less contrast — wall, sky, etc.
- [d] Finely detailed repetitive patterns
- [e] When the distance between subjects at the center is extreme (e.g. one subject is close, the other is away)
- [f] Subjects beyond screens, nets, etc. or when another subject passes across the camera
- [g] Horizontal stripes
- [h] Diagonal object
- [i] When there is frosted glass between the shooting object and the recorder
- [j] Bright object or object reflecting light
- [k] When shooting under a fluorescent lamp at the shutter speed set to 1/250, 1/1000, 1/4000, 1/10000.

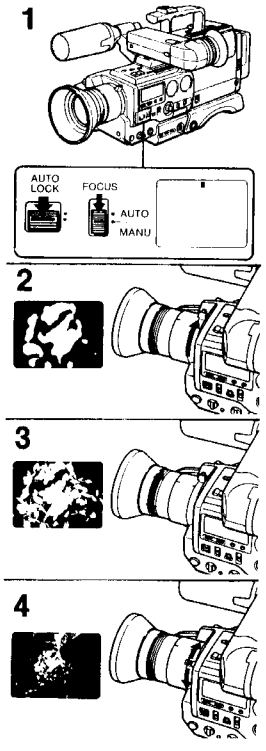
Other Uses of Manual Focusing

- When the white mark inside the viewfinder blinks
- When using special effects lenses or filters
- When shooting still subjects on a tripod
- To save battery wear
  (When the AUTO LOCK switch is set to AUTO LOCK, the auto focusing operates to move the focus ring automatically even in recording pause mode. This causes the battery to wear continuously.)
- For focusing in close-up shooting, see page 110.

Auto focusing system
The auto focusing system incorporated in this unit utilizes high-precision sensors to determine picture contrast at the center of the viewfinder screen (the blue portion marked in the illustration) and adjust focus accordingly for automatic, highly accurate focusing G-10

G-10

G-11



Notes

Auto focus does not function momentarily in these cases;

- When the shutter speed or the white balance is changed
- When the iris is being adjusted
- When lighting conditions change quickly
- When the zooming is changed from wide-angle to telephoto
- When the sensitivity is changed.

It may take several seconds to get focus when the camera is rapidly panned from a distant subject to a near subject with less contrast. In this case, adjust the focus manually.

Note on automatic adjustment

While recording with the auto focusing function, do not touch the focus ring forcibly.

To Focus Manually G-11

1 Set the AUTO LOCK switch to the lower position and set the FOCUS switch to MANU.
The white mark (■) will be shown in the viewfinder.
2 Turn the manual zoom lever to the telephoto position (88) to make the subject as large as possible in the viewfinder.
3 Turn the focus ring to achieve sharp focus.
4 Set the desired shot length using the manual zoom lever.

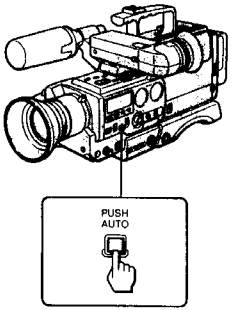
Some helpful hints

- When shooting a scene with lots of movement in bright light, the subject can be kept in good focus by setting the zoom lever to the wide-angle position and the focus ring to 2 m, regardless of the distance between the subject and the recorder.
- When shooting in low light situations such as indoors, the depth of field in proper focus is very shallow. For best results, shoot at wide angles, after focusing in telephoto.
- The figures on the focus ring indicate the distance between the subject and the Φ mark on the recorder.

When not supplied wired commander is used

The focus adjustment cannot be set to auto or manual with the commander.

G-12

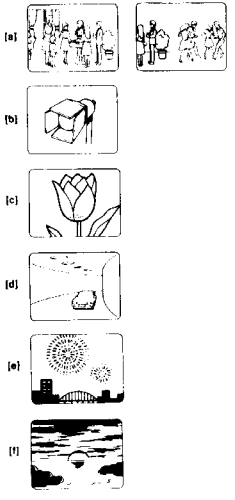


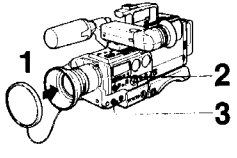
Quick Focus Adjustment G-12

Press the PUSH AUTO button during recording in the manual focusing mode. Auto focusing will be activated only when the PUSH AUTO button is kept depressed.

Manual White Balance Adjustment

H-1





The auto white balance function of this unit operates automatically.
However, to record the color of the subject more correctly so that it is not affected by the color temperature of the ambient light, adjust the white balance manually using the white lens cap.

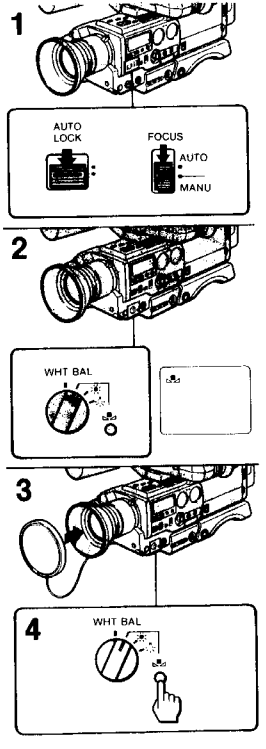
Difficult Conditions for Auto White Balance H-1

[a]	When lighting conditions change quickly	☆
[b]	When the light source for the subject is different from that illuminating this unit, such as when the subject is in a spotlight, etc.	☆
[c]	When shooting a monochromatic subject or the background is monochromatic	🖳
[d]	• When recording under a sodium lamp	☆
	• When recording under a mercury lamp	☆
	• When recording under a white fluorescent lamp	☀
[e]	When recording outdoors, such as a night view, neon sign or fireworks	☀
[f]	When recording outdoors, such as scenes after sunset or scenes before sunrise.	☀

To Adjust the White Balance Manually

1 Attach the white lens cap.
2 Set the AUTO LOCK switch to the lower position.
3 Set the WHT BAL control to the desired position.

H-2



To Adjust the White Balance Precisely

After setting the white balance with the 🖳 button according to the subject, even if the light source is changed, the adjustment is held. It is convenient to record some subjects in the different light conditions in the same white balance setting. H-2

1 Set the AUTO LOCK switch to the lower position, FOCUS switch to MANU and adjust the focus manually.
2 Set the WHT BAL control to 🖳.
The 🖳 indication will appear inside the viewfinder.
3 Attach the white lens cap to the recorder and point the recorder at a subject (outdoors) or a light source (indoors).
4 Press the 🖳 button.
The 🖳 indication will light up.
The adjustment is memorized for 1 hour even after the POWER switch is set to OFF.

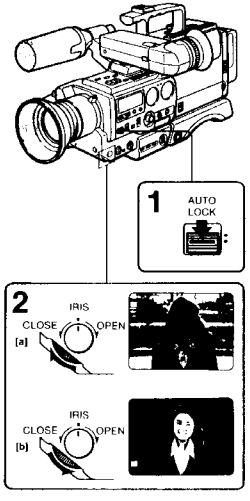
When recording in studio light or video light
Set the WHT BAL control to ☆. The ☆ mark position has been set so as to adjust the white balance according to studio lights or video lights.

When recording in fluorescent light
Use the AUTO mode to adjust the white balance precisely.

Notes
- When the light source is changed, reset the 🖳 mode again.
- When the one push white balance is adjusted for low light situations or without the white lens cap on the lens, even if the 🖳 button is pressed, the 🖳 indicator does not light up.
- The 🖳 button does not function during recording.
- The white balance is related to iris and shutter speed adjustment. When the iris or shutter speed is adjusted manually, if the recorder is moved indoor to outdoor or vice versa, set the AUTO LOCK switch to AUTO LOCK and reset it to the lower position again.
- When the recorder has been moved indoor to outdoor, or vice versa, or when the battery has been changed, slide the STANDBY switch up and point the recorder to a white object for about 10 seconds so that the white balance is adjusted properly.

Manual Iris Adjustment

H-3



The iris is adjusted automatically when the AUTO LOCK switch is set to AUTO LOCK (green position). When shooting a scene with strong contrast, adjust the iris manually.

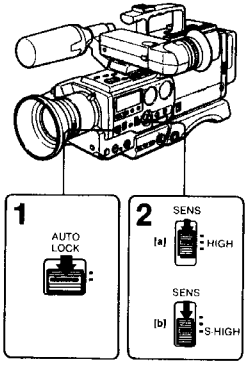
1 Set the AUTO LOCK switch to the lower position (white mark).
2 Adjust the IRIS control.
   [a] When backlit shot results in the subject being too dark: **Turn IRIS toward OPEN.**
   [b] When a subject is too bright against a dark background: **Turn IRIS toward CLOSE.**

After shooting that particular scene, set the IRIS control to the center position (green mark) or set the AUTO LOCK switch to AUTO LOCK.

Note
Avoid pointing the recorder at the sun with the IRIS control set to OPEN.

Manual Sensitivity Adjustment

H-4



When the entire scene is too dark and the subject is not clear, adjust the sensitivity. H-4

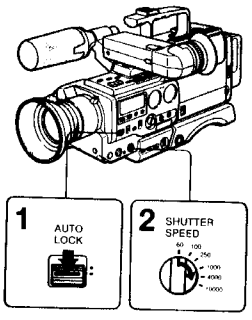
1 Set the AUTO LOCK switch to the lower position (white mark).
2 Set the SENS switch to HIGH or S-HIGH.
   [a] dark
   [b] too dark

After shooting that particular scene, set the SENS switch to the upper position or set the AUTO LOCK switch to AUTO LOCK.

About sensitivity adjustment
- The effect of this function will be obtained only when the scene is dark.
- When the SENS switch is set to HIGH or S-HIGH, the picure may show poor definition.

H-5

H-6



Shutter Speed Adjustment

When a fast-moving subject is recorded at a normal shutter speed, its still picture may not be seen clearly when played back H-5. This can be improved by increasing the shutter speed.
The shutter speed of this unit can be selected from six speeds, 1/60 (normal speed), 1/100, 1/250, 1/1000, 1/4000 or 1/10000 second.
However, when the shutter moves fast, it will not allow enough light to come into the lens, so the picture will be dark. Therefore, when recording at a high shutter speed, record in a brighter place than usual.
Choose an appropriate shutter speed according to the place and situation.
See the chart below for examples.

Example use	Recommended shutter speed
• On clear days, recording golf or tennis scenes (To view the hit ball clearly in the pause mode, set to 1/4000 or 1/10000) • Recording the skiers	1/10000 or 1/4000
• On overcast days, recording a moving merry-go-round or jet-coaster • Recording outdoors from inside a vehicle (for stable shooting)	1/1000 or 1/250
• Instead of the ND2 filter (To reduce the exposure level to approx. 1/2) • Recording indoors (for stable shooting)	1/100

H-6

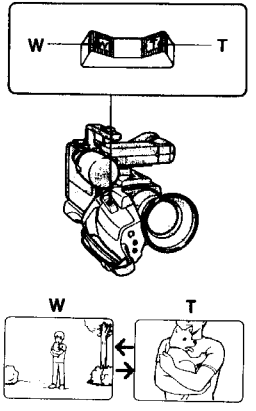
1 Set the AUTO LOCK switch to the lower position.
2 Set the SHUTTER SPEED control to the desired shutter speed.

No indication → 100 → 250 → 1000 → 4000 → 10000
(1/60) (1/100)(1/250)(1/1000) (1/4000)(1/10000)

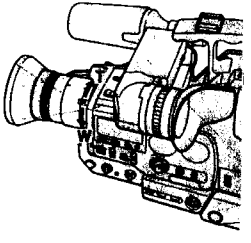
Shutter Speed Adjustment

Notes
- When shutter speed 1/250 or faster is selected, recording must be done under sunlight or video light.
- When the shutter speed is changed during a camera recording of a TV screen, the brightness of the recorded picture may vary.
- When a very bright object is shot at a faster shutter speed, a light, vertical, belt-like line ("smear") may appear on the screen.
- When the recording is done under a light discharged tube, such as a fluorescent lamp, sodium lamp, or mercury lamp, the brightness of the recorded picture may vary ("flicker").

H-7



H-8



Zooming

The size of the subject in the scene can be changed.

Power Zoom H-7

— for smooth and constant zooming

Press the T side of the power zoom button for telephoto and the W side for wide-angle.
The zoom ring will move automatically.

The zooming speed is faster when the power zoom button is pressed firmly, and slower when the button is pressed lightly.

Note on use of the commander
During the fast-forward or rewinding operation, the power zoom button on the commander will not function.

Manual Zoom H-8

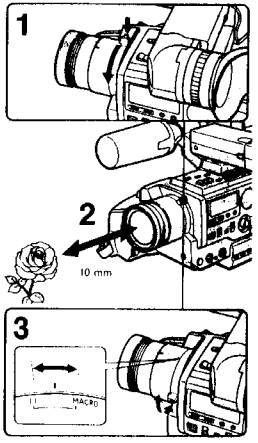
— to create a dramatic effect

Turn the manual zoom lever upward for telephoto and downward for wide-angle.

For more zooming effect
- The focal length of this unit is 11 mm to 88 mm. Converted into the focal length of a 35 mm camera, this means approximately f-44 mm to 352 mm.
- The zooming speed cannot be changed by the supplied Remote Commander.

Close-ups (Macro) H-9

H-9



Even tiny objects can literally fill the screen for dramatic close-up effects.
Remove the lens hood before operation.

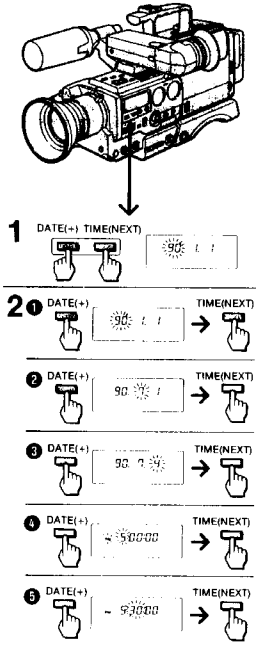
1 Turn the zoom lever to the MACRO position, pressing the macro set buttton.
2 Bring the recorder as close as necessary to obtain the desired subject size.
The subject can be as close as approximately 10 mm (3/8 in.) from the lens surface.
3 Turn the zoom lever within the MACRO range to focus sharply.

Notes

- Auto focusing does not function in macro shooting.
- If the subject is closer than 10 mm, it cannot be brought into focus.
- When shooting in macro, the depth of field is very shallow, so pay attention to focus. To keep the subject in focus, use a tripod or monopod.

Recording Date or Time

H-10



Once the date and the current time are adjusted, the date or time can be recorded together with the picture.

Before setting the date and time, make sure that the fully-charged battery pack and lithium battery are installed.

To Set Date and Time H-10

1 Press the DATE and TIME buttons simultaneously **for more than 3 seconds.**
The date indication will appear in the display window (date/time setting mode).
The DATE button now functions as the + button and the TIME button functions as the next button.
2 Adjust the ● year, ● month, ● day, ● hour and ● minute in sequence, following the illustration.
First adjust the blinking digits with the DATE button, and then press the TIME button.
After adjusting the minute digits, press the TIME button at the same time with an announced time signal.

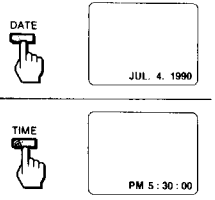
The clock starts operating. There is no need to readjust the date and time as long as the lithium battery remains.

To clear the time indication from the display
Press the TIME button again.

The DATE button can be pressed in two ways

- When you keep the button pressed, the digits will advance continuously.
- When you press and immediately release the button, the digits will advance by one.

H-11



To check the preset date or time
Press the DATE or TIME button in the recording pause mode. When the same button is pressed again, the indication goes off.

To readjust an incorrect date or time
Set the unit to date/time setting mode and press the TIME button repeatedly until the incorrect digit blinks. Correct it with the DATE button and press the TIME button. After adjusting the minute digits, press the TIME button at the same time with an announced time signal.

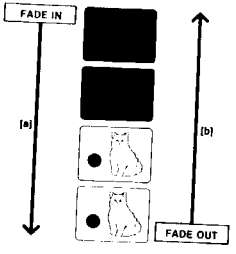
Note
The date and time cannot be set during recording.
If the recorder is set to the recording mode while setting the date and time, the setting mode will be released.

To Record the Date or Time H-11

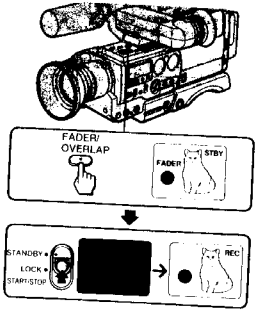
During camera recording or in recording pause mode, press the DATE or TIME button to display the date or time on the viewfinder screen.
The date or time being displayed will be recorded together with the picture.

To stop recording the date or time
Press the DATE or TIME button again. The picture recording will continue.

I-1



I-2



I-3

Fade-in and Fade-out I-1

When fade-in, the picture and sound will appear gradually from a black, silent scene. **[a]**
With fade-out, the picture and sound will disappear gradually. **[b]**
Dramatic effects can be added by using fade-in at the beginning of a recording and fade-out at the end.

To Fade in I-2

1 Slide the STANDBY switch up to set the unit to recording pause mode.
2 Press the FADER/OVERLAP button **once**.
3 Press START/STOP button to start camera recording.
Fade-in will be performed.

To Fade out I-3

1 Start camera recording.
2 Press the FADER/OVERLAP button **once**.
3 At the point where fade-out is to be started, press the START/STOP button.
Fade-out will be performed and then recording will stop.

To cancel FADER mode before fade-in or fade-out
Press the FADER/OVERLAP button **twice** so that the FADER indication disappears.

Notes
- The FADER/OVERLAP button will function while the STBY or REC indication lights. When the +VTR button is set in the direction of the arrow, the FADER/OVERLAP button will not function in the stop mode.
- The FADER mode is cancelled automatically once fade-in or fade-out has been performed.
- When fade-in or fade-out is operated while the title appears, the title will change to monochrome.

Interval Recording

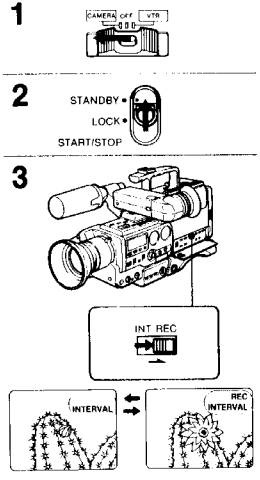
A recording of one second will be activated repeatedly at one minute intervals. This is convenient for recording changes such as a flower developing from bud to flower or on insect growing wings. I-4

1 While pressing the small button, set the POWER switch to CAMERA.
2 Set the video camera recorder to the recording pause mode.
3 Slide the INT REC button in the direction of the arrow. The interval recording will be started and the "STBY INTERVAL" will be displayed.
4 Slide the INT REC button in the direction of the arrow to stop the interval recording.

- For interval recording, signals from the VIDEO/AUDIO input jacks can be used. Set the POWER switch to VTR.

For stable recording, use a tripod. I-5

I-4



I-5

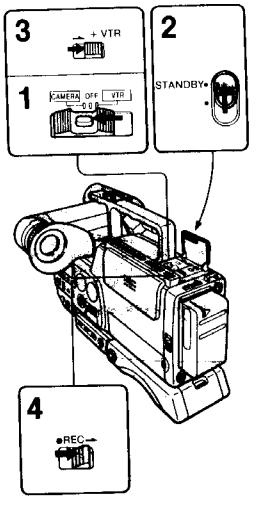
Frame Recording

A recording of six frames can be activated manually for creating an animated program of your own. I-6

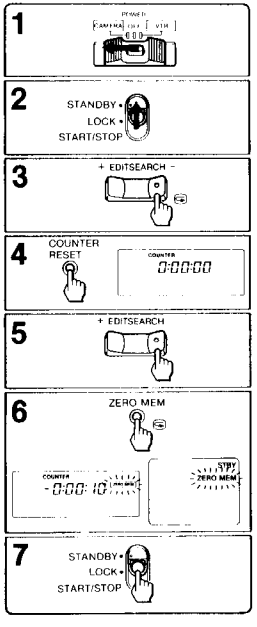
1 While pressing the small button, set the POWER switch to CAMERA.
2 Slide the STANDBY switch up.
3 Set the +VTR switch in the direction of the arrow.
4 Slide the REC switch in the direction of the arrow.
A recording of six frames will be made and the recording pause mode will resume.
5 Move the subject a little and repeat step 2 as many time as you like.

- For frame recording, signals from the VIDEO/AUDIO input jacks can be used. Set the POWER switch to VTR.
- After completing the frame recording, be sure to set the +VTR switch in the opposite direction of the arrow.

I-6



I-7



You can insert (record) video and audio simultaneously from the camera onto any recorded tape.

Operation I-7

Monitor the picture being inserted on the viewfinder screen.
- Make sure that the +VTR switch is set in the opposite direction of the arrow.

1 While pressing the small button, set the POWER switch to CAMERA.
2 Slide the STANDBY switch up to set the unit to recording pause mode.
3 Keep pressing the "+" or "−" side of the EDITSEARCH button and release the button at the point where the insert should **end**. The unit will be set to recording pause mode.
4 Display the counter in the display window and press the COUNTER RESET button. The counter is reset to zero. (For an accurate ending point, press the COUNTER RESET button immediately after the EDITSEARCH button is released and while the still picture is displayed.)
5 Keep pressing the "−" side of the EDITSEARCH button and release the button at the point where the insert should **begin**.
6 Press the ZERO MEM button. The insert ending point is stored in memory.
7 Press the START/STOP button. Insert recording will begin.

The insert recording will stop automatically near the counter zero point.

To cancel ZERO MEM mode
Press thee ZERO MEM button so that the ZERO MEM indicator disappears.

To change the insert ending point
Press the ZERO MEM button to turn off the ZERO MEM indicator and repeat steps 3 through 6 above.

Editsearch

To insert the date or time
Follow steps 1 through 6 above, press the DATE or TIME button to display the date or time indication on the viewfinder screen and then press the START/STOP button.

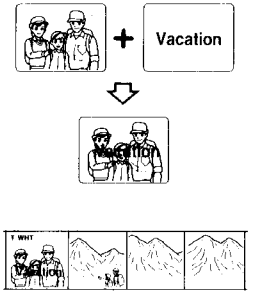
When the battery is removed with the STANDBY switch slid up
Smooth recording cannot be made and overlap operation may not function correctly. For smooth recording or overlap operation, search the point where the insert should begin with the EDITSEARCH button and then start recording or overlap operation.

Notes on ZERO MEM mode
ZERO MEM mode is cancelled automatically in the following cases.
- When an insert recording is completed.
- When the position of the POWER switch is changed.
- When the power is turned off.
- When the cassette is ejected.

To restore it, press the ZERO MEM button again.

Notes
- When recording pause mode lasts for approximately 5 minutes, pause mode will be automatically released and the unit will be turned off.
- When the inserted tape is played back, the picture may be distorted at the end of the inserted program.

J-1



Recording a Title

Before recording, memorize a title or figure. The memorized title or figure is superimposed onto the picture being recorded. J-1
- Two kinds of titles or figures can be memorized.
- The color of the title or figure can be selected from 8 colors.

Make sure that the lithium battery is installed. See page 52.

Preparations

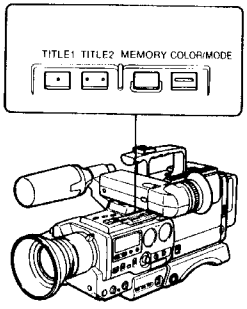
To make a desired title card
- Use a white and plane card and draw the title on it with a deep color (black is recommended for the best result) in thick letters. If contrast is clear, a signboard can be memorized like the title card.
- When deciding the title size, check the effective picture size on your video monitor.

Before memorizing a title
- Fix the title card and the video camera recorder.
- Use of an appropriate light is recommended for a better result.

Function of the COLOR/MODE button
This button is used to select the title color or title mode.

When the title is displayed	When the title is not displayed
Used as the COLOR button.	Used as the MODE button.
WHT → BLUE → GRN → CYAN (white) (green) BLK ← YEL ← VIO ← RED (black) (yellow) (violet)	No title mode → ↑ → ■ → ■↑ ↑: title scroll mode ■: title reverse mode ■↑: title reverse and scroll mode
Each push of the COLOR/MODE button cyclically changes the color or mode.	

J-2



To Memorize the Title J-2

1 While pressing the small button, set the POWER switch to CAMERA.
2 Slide up the STANDBY switch to set the unit in the recording pause mode.
3 Point the camera to the title card and adjust the focus.
4 Press the TITLE 1 or 2 button.
5 Press the MEMORY button to memorize the title.
6 Select the title color while observing the color indication in the viewfinder. Each push of the COLOR/MODE button cyclically changes the color, as follows:

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black)←YEL (yellow)←VIO (violet)←RED

7 Press the TITLE 1 or 2 button (pressed in step 4) to turn off the title.

Notes
- The color indication in the viewfinder is not recorded on the tapes.
- You can change the title color even after starting the recording.

To check the title
To check the memorized title, press the TITLE 1 or 2 button. To turn off the title, press the button again.

To Record the Title

To record the title from the beginning
Press the TITLE 1 or 2 button in recording pause mode, and then start recording.

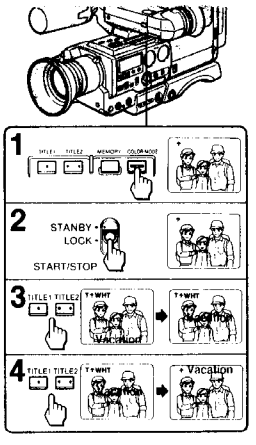
To record during camera recording
Press the TITLE 1 or 2 button at the point from which the title is to be inserted.
The memorized title will be recorded together with the picture.

To stop recording the title
Press the TITLE 1 or 2 button again. The picture recording will continue.

To record the same title several times
By repeating the above procedure, you can record the title as many times as desired.

J-3

J-4



To Scroll the Title from Bottom to Top

During recording, the memorized title can be scrolled from bottom to top. J-3

To record the scrolled title J-4
1 In the recording pause mode, press the COLOR/MODE button.
The arrow mark will be displayed.
2 Start the camera recording.
3 Press the TITLE 1 or 2 button at the point from which the scrolled title is to be recorded.
4 After the title stops at the center of the picture, press the TITLE 1 or 2 button again. The title is scrolled from center to top.

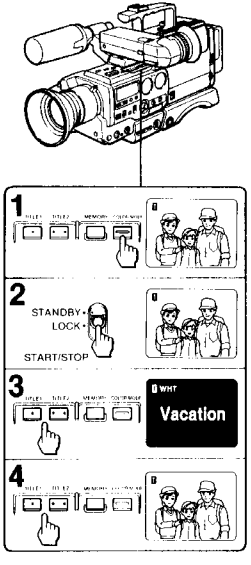
To clear the scroll mode
After recording, press the COLOR/MODE button **three times.**

If you do not want to record the picture for the background
Point the recorder to a white, flat object such as a white wall, paper, etc.

To change the color of the title
While the title is being scrolled or displayed at the center, press the COLOR/MODE button.

J-5

J-6



To Reverse the Title and the Background

The color scheme of the title and the background can be reversed. J-5

To record the reversed picture from the beginning

1 In the recording pause mode, press the COLOR/MODE button **twice.**
The ▮ mark will be displayed.
2 Press the TITLE 1 or 2 button.
3 Start the camera recording.
4 Press the TITLE 1 or 2 button again to clear the reversed picture.

To record the reversed picture during recording J-6

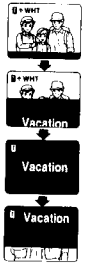
1 In the recording pause mode, press the COLOR/MODE button **twice.**
The ▮ mark will be displayed.
2 Start the camera recording.
3 Press the TITLE 1 or 2 button at the point from which the reversed picture is to be recorded.
4 Press the TITLE 1 or 2 button again to clear the reversed picture.

To clear the reverse mode
After recording, press the COLOR/MODE button **twice.**

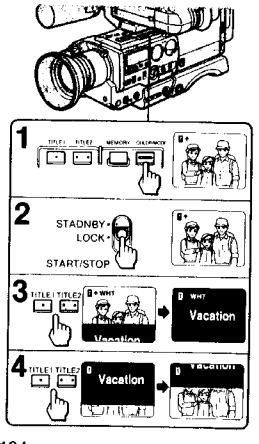
If you do not want to record the picture for the background
Point the recorder to a white, flat object such as a white wall, paper, etc.

To change the color of the background
While the title is being displayed, press the COLOR/MODE button.

J-7



J-8



To Scroll the Reversed Title J-7

To record the reversed and scrolled title J-8

1 In the recording pause mode, press the COLOR/MODE button **three times.**
The arrow mark and the ▮ mark will be displayed.
2 Start the camera recording.
3 Press the TITLE 1 or 2 button at the point from which the scrolled title is to be recorded.
4 After the reversed title stops at the center of the picture, press the TITLE 1 or 2 button again.
The reversed title is scrolled from center to top.

To clear the reversed scroll mode
After recording, press the COLOR/MODE button **once.**

If you do not want to record the picture for the background
Point the recorder to a white, flat object such as a white wall, paper, etc.

To change the color of the background
While the title is being scrolled or displayed at the center, press the COLOR/MODE button.

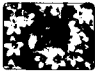
Viewing Digital Pictures

The digital picture function performs digital image processing of the recording or playback pictures and displays them on the screen with various effects.

Digital Pictures Viewed with this Unit K-1

K-1

[a]



[b]

[c]

[d]

[e]

[f]

Display Page	Digital picture name	Operation: at camera recording	Operation: at playback	Page
[a]	**Digital still picture superimpose** A desired shaped picture can be recorded in the desired portion of the still picture.	Yes	No	43
[b]	**Overlap** The new scene appears and is recorded gradually on the last recorded scene.	Yes	No	43
[c]	**Digital zoom** The center portion of the picture is zoomed up twice.	Yes	Yes	43
[d]	**Picture in still** A small picture is displayed in the lower right position of the still picture and a new scene can be recorded there or the playback picture can be viewed.	Yes	Yes	43
[e]	**Strobe** The mooving white object is viewed with the after-image.	Yes	Yes	43
[f]	**Solarization** A picture with a solarization effect can be viewed.	Yes	Yes	43

to be continued

K-2

[g]

[h]

[i]

[j]

K-2

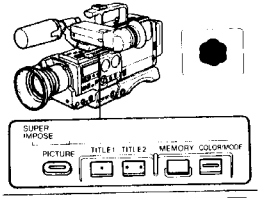
Display Page	Digital picture name	Operation: at camera recording	Operation: at playback	Page
[g]	**Noise reduction** A picture with noise reduced can be viewed.	Yes	Yes	43
[h]	**Stop motion** A still picture can be viewed.	Yes	Yes	43
[i]	**Flash motion** The picture freezes, and after a given period of time the next still picture can be viewed.	Yes	Yes	43
[j]	**Multi-picture** 9 frame pictures can be viewed. A still picture appears up to 8 frames successively at specific intervals and the normal playback or recording is continued on the last section.	Yes	Yes	43

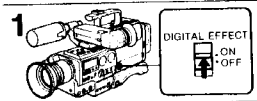
Using with the title operation
During the digital picture operation, the memorized title will be superimposed by pressing the TITLE (1 or 2) button.

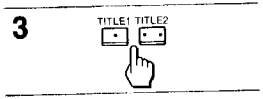
Note on the digital picture
The color may vary.

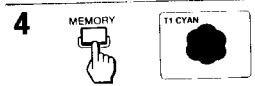
Note on DIGITAL EFFECT switch
During recording, do not change the setting of the DIGITAL EFFECT switch. The switch will not function.

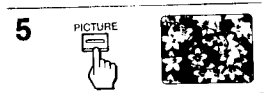
K-3

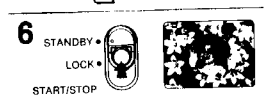












To Record a Desired Shaped Picture in the Desired Portion of the Still Picture

— Digital Still Picture Superimpose

This function can be operated at camera recording (At playback, it cannot be operated.)

Before operation, draw the shape of the portion in which the picture is recorded (pattern) with a deep color in thick letters. (See "To make a desired title card" on page 126.) K-3

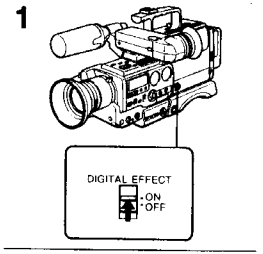
1 Set the DIGITAL EFFECT switch to ON.
2 Set the recorder in the recording pause mode.
3 Press the TITLE 1 (or 2) button.
4 Memorize the pattern.
5 Point the recorder to the subject for the still picture and press the PICTURE button. The portion except the pattern will be frozen.
6 Start recording. The picture will be recorded in the memorized pattern.

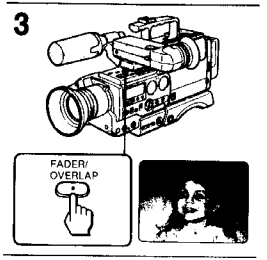
To stop the digital still picture superimpose
Press the PICTURE button again or the CLEAR button (on the side panel). The still picture will be cleared and the normal recording will be continued.

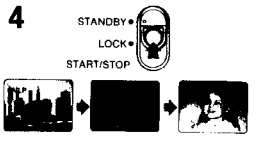
To make the pattern
A print or signboard with strong contrast can be memorized for the pattern.
The portion of low saturation will be memorized for the pattern.
By using the title reverse function, the portion of high saturation will be memorized for the pattern.

Note
When other digital picture button is pressed, the digital still picture superimpose function will be cleared.

K-4







To Record a New Scene Gradually from the Last Recorded Scene

— Overlap K-4

This function can be operated at camera recording (At playback, it cannot be operated.)

1 Set the DIGITAL EFFECT switch to ON.
2 After recording the scene to be overlapped, set the recorder in the recording pause mode.
3 Press the FADER/OVERLAP button **twice**.
4 Start recording.

To stop the overlap before operation
Press the FADER/OVERLAP button **once**.

After the overlap is executed
The overlap function will be cleared automatically.

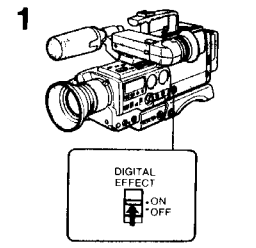
The OVLP indication will blink inside the viewfinder in the following cases
- The DIGITAL EFFECT switch has been set to ON during recording.
- Other digital picture button has been pressed.

When the OVLP indication blinks, the overlap function cannot be used.
To operate the overlap function, find the last scene with the EDITSEARCH button and then press the FADER/OVERLAP button **twice**.

To overlap on a scene of the recorded tape
1 Set the DIGITAL EFFECT switch to ON.
2 Set the recorder in the recording pause mode by sliding the STANDBY switch up.
3 Find the last scene to be overlapped with the EDITSEARCH button.
4 Press the FADER/OVERLAP button **twice**.
5 Start recording.

Notes
- When other digital picture button is pressed, the overlap function will be cleared.
- When the START/STOP button is pressed, the picture may be disturbed momentarily. This is not a failure of the unit.

K-5



To Zoom up the Center Portion of the Picture Twice

— Digital Zoom K-5

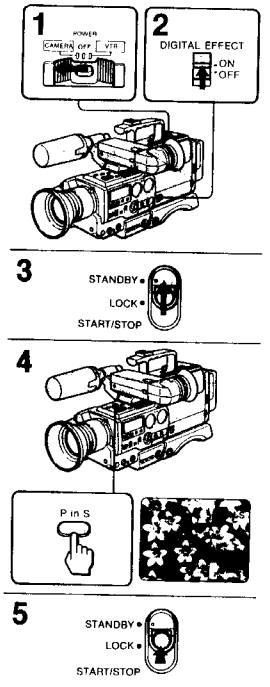
To zoom up during recording
Set the POWER switch to CAMERA.
1 Set the DIGITAL EFFECT switch to ON.
2 During recording, press the DIGITAL ZOOM button at the point where you zoom up the subject.

To zoom up during playback
1 Set the POWER switch to VTR and play back the tape.
2 Set the DIGITAL EFFECT switch to ON.
3 During playback, press the DIGITAL ZOOM button at the point of the subject where you want to zoom up.

When the picture which is zoomed up twice at camera recording is zoomed up twice by pressing the ZOOM button at playback, you can view the picture four time as large as that of the real subject.

To stop the digital zoom
Press the DIGITAL ZOOM button again or the CLEAR button (on the side panel).

K-6



To Record a New Scene or View the Playback Picture in the Small Picture in the Still Picture

— Picture in Still

To record a small new scene in the still picture K-6

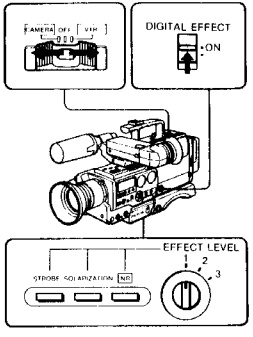
1 Set the POWER switch to CAMERA.
2 Set the DIGITAL EFFECT switch to ON.
3 Set the recorder in the recording pause mode.
4 Point the camera towards the subject which you want to make in the still picture and press the P in S button.
The small picture will appear in the lower right position of the still picture.
5 Start recording.
The new scene will be recorded in the small picture.

To view the small playback picture in the still picture
1 Set the POWER switch to VTR and play back the tape.
2 Press the P in S button in the desired scene.
The scene when the P in S button is pressed will be frozen and the following scene will be viewed in the small picture.

To stop the picture in still
Press the P in S button again or the CLEAR button (on the side panel). The small picture will be cleared and normal playback will be continued.

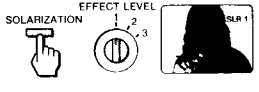
Note
When other digital picture button is pressed, the picture in still function will be released.

K-7

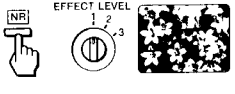


K-8

K-9



K-10



Strobe/Solarization/Noise Reduction K-7

This function can be operated at camera recording and at playback.
Set the POWER switch to CAMERA or VTR and set the DIGITAL EFFECT switch to ON.

To record or play back the moving white object with the after-image — Strobe K-8
Press the STROBE button.

The level of the strobe effect can be changed with the EFFECT LEVEL control.
When the EFFECT LEVEL control is set to 3, the level is increased to the maximum.

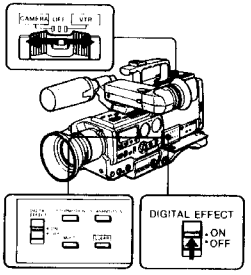
To record or play back a picture with a solarization effect — Solarization K-9
Press the SOLARIZATION button.

The level of the solarization effect can be changed with the EFFECT LEVEL control.
When the EFFECT LEVEL control is set to 3, the level is increased to the maximum.

To record or play back a picture with reduced noise — Noise Reduction K-10
Press the NR button.

Set the EFFECT LEVEL control to change the effect.

K-11



K-12

K-13

K-14

K-15

Stop Motion/Flash Motion/Multi-Picture

This function can be operated at camera recording and the playback.
Set the POWER switch to CAMERA or VTR and set the DIGITAL EFFECT switch to ON. K-11

To freeze a picture — Stop Motion
Press the STOPMOTION button. K-12

To record or play back still pictures successively at specific intervals — Flash Motion
Press the FLASHMOTION button. K-13

By pressing the FLASHMOTION button, the intervals at which the still picture is switched are changed.

To record or play back 9 frames picture on the screen — Multi-Picture
Press the MULTI button. K-14

To stop the digital picture K-15
Press the CLEAR button (on the side panel).

When other digital picture button is pressed, the function of the pressed button will work.

VTR Operation

Preparation for Playback

When the VCR is connected to the TV, refer to the pages 170 to 174.

Connecting a TV

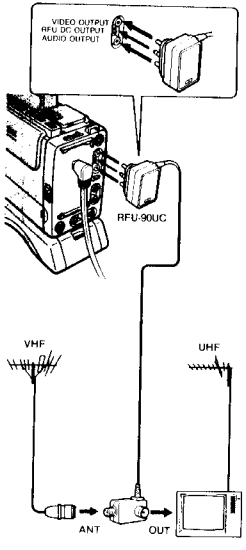
Connecting a TV without audio/video input connectors L-1

1 Connect the RFU adaptor to the CCD-V5000.
2 Connect the VHF antenna and TV to the RFU adaptor.
Use a 75-ohm coaxial cable for antenna connection.

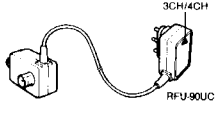
The sound is monaural.

On the TV channel for the video camera recorder L-2
Whenever you view the playback picture, set the channel selector of the RFU adaptor to either VHF channel 3 CH or 4 CH and select the same channel on the TV.

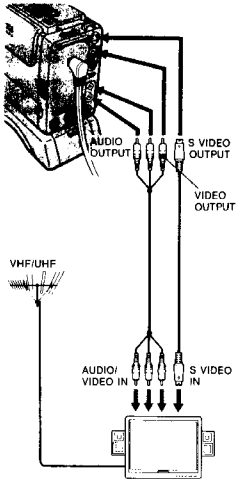
L-1



L-2



L-3



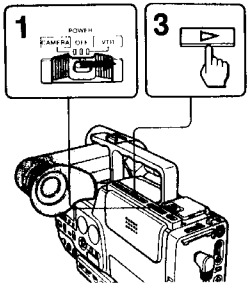
Connecting a TV (or color monitor) equipped with andio/video input connectors L-3

Leave the TV antenna cable connected to the TV.
1 Connect the CCD-V5000 to the TV using the supplied audio/video cable.
When a TV is equipped with the S VIDEO input connector, connect the S VIDEO OUTPUT to the S video input with the supplied connecting cord with the S connectors.
2 Set the TV/VIDEO selector button on the TV as follows:

For viewing a playback picture → VIDEO
For viewing TV programs → TV

Playback

M-1



M-2

Turn on the TV (or color monitor), and select the channel for viewing a playback picture (or set the TV/VIDEO selector to VIDEO).

M-1

1 While pressing the small button, set the POWER switch to VTR.
2 Insert a cassette.
3 Press the ▷ button.
Playback will start.

To stop the tape, press the ■ button.

After using, be sure to set the POWER switch on the recorder to OFF.

To view a still picture M-2
Press the ❚❚ button during playback. To resume playback, press the ❚❚ button again.

Monitoring a High-Speed Picture

During playback — Picture search
1 In the playback mode, press the ◀◀ or ▶▶ button.
The picture will be monitored at high speed as long as it is kept pressed.
2 Release the ◀◀ or ▶▶ button at the desired point.
Normal playback will resume.

During fast-forward or rewind — Skip scan
1 Press the ▶▶ button in fast-forward mode or press the ◀◀ button in rewind mode.
The picture is displayed while the button is kept pressed.
2 Release the ◀◀ or ▶▶ button to resume normal fast-forward or rewind mode.

Notes
- If you move the position of the POWER switch during playback, the tape will stop. When you move the POWER switch to CAMERA in the playback pause mode, however, the unit will enter recording pause mode.
- When the pause mode lasts for 5 minutes or more, the unit will automatically enter the stop mode.
- Streaks will appear and the sound will be muted in the high-speed picture.

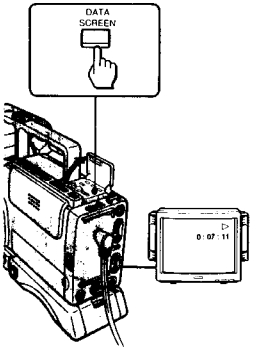
Frame-by-frame playback
Press the ❚▶ button in the still picture mode. To resume normal playback, press the ▷ button.

Slow motion playback
Press the ❚▶ button in the still picture mode or playback mode. To resume normal playback, press the ▷ button.

To adjust the frame-by-frame and slow playback pictures
Press the SLOW ADJ buttons.
The adjustment can be kept memorized until the lithium battery is exhausted.

Notes
- When a tape is recorded in the SP mode, streaks will appear and sound will be muted in the still picture, frame-by-frame playback and slow playback modes.
- When the playback picture is viewed on another VCR or the viewfinder of this unit, adjust the picture again.
- When a tape is recorded on another VCR, adjust the playback picture. However in some cases the picture may not be adjusted.
- Noise may appear in the still picture mode.

M-3



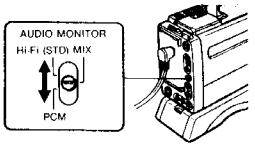
To Display the Indication on the Viewfinder Screen on the TV M-3

Press the DATA SCREEN button.
The indication on the viewfinder screen is superimposed on the TV program.
It is convenient to check the indication on the TV screen when the playback picture is viewed on the TV or when the video camera recorder is operated from a distance using the Remote Commander.

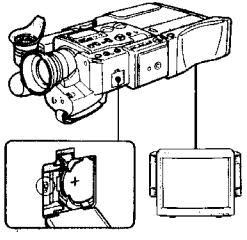
To clear the indication, press the DATA SCREEN button again.

Notes
- To edit from the CCD-V5000 to another VCR, clear the indication on the TV or the indication will be recorded with the picture.
- During playback or in the still picture mode, the data indications appear to shake.

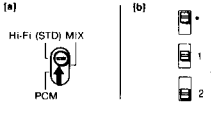
M-4



M-5



M-6



Selecting the Sounds to be Monitored

The sounds to be monitored can be selected by the AUDIO MONITOR switch. M-4

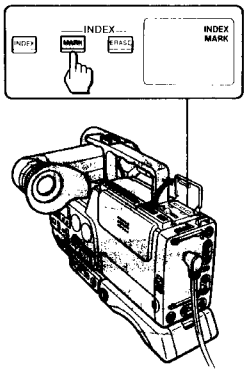
Hi-Fi (STD)	To monitor the hi-fi stereo sound recorded on the standard track
PCM	To monitor the digital stereo sound recorded on the PCM track
MIX	To monitor the hi-fi and digital stereo sounds recorded on the standard and PCM tracks

Playing back the audio dubbed tape
Set the AUDIO MONITOR switch to PCM or MIX. If the switch is set to Hi-Fi, the audio dubbed sound cannot be monitored.

Playing back the dual sound recorded tape

Normally set the hi-fi sound output select switch to "•" (upper) position. M-5
When the dual sound recorded tape is played back, set the AUDIO MONITOR switch to Hi-Fi (STD) and select the desired sound with the hi-fi sound output select switch. M-6
[a] AUDIO MONITOR switch
[b] Hi-fi sound output select switch

N-1



To Mark Index Signals during Playback

The desired programs can be easily located by the index signals marked on the tape.
Press the MARK button at any desired point on the tape during playback. N-1

When the index signal is marked in the playback pause mode, the index signal will be marked just after the playback pause mode is released.

Notes on marking the index signals
- The index signals can be marked at any desired point. Make sure there is more than 2 minutes of space between two index signals. If there is more than one index signal marked within an interval of 2 minutes at the normal tape speed, the unit may not function properly.
- The recorded sound cannot be heard and a black bar appears at the bottom of the playback picture while the index signal is being marked during playback. However, the recorded signals are not affected.
- The index signals cannot be registered on a cassette tape whose safety tab is slid out.
- The index signals cannot be registered in the LP mode.

To Mark Index Signals during Playback

To Scan or Search the Program during Playback

To scan the beginning of each program during monitoring the picture — Index scan (1) N-2

1 Press the INDEX button in the playback or playback pause mode.
2 Press the ◀◀ or ▶▶ button.
The tape is played back for approximately 10 seconds at the point where the index signal is marked.
3 To continue playback, press the ▷ button.
When no button is pressed, the picture is automatically scanned to the next or previous program.

To scan the beginning of each program in sequence — Index scan (2) N-3

1 Press the INDEX button in the stop mode.
2 Press the ◀◀ or ▶▶ button.
The tape is played back for approximately 10 seconds at the point where the index signal is marked.
3 Press the ▷ button to continue playing back the desired picture.

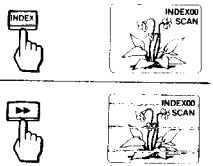
When no button is pressed, the picture is automatically scanned to the next or previous program.

To locate the desired program — Index search N-4

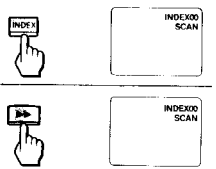
1 Press the INDEX button in the stop or playback mode.
2 Press the INDEX button again until the index number of the desired program is displayed on the viewfinder screen.
3 Press the ◀◀ or ▶▶ button.
The playback is started at the beginning of the designated picture.

To correct the index number
Press the ■ button and repeat the above steps.

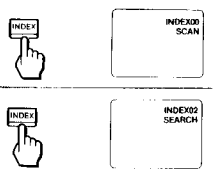
N-2



N-3



N-4



N-5

To Mark Index Signals during Playback

To Erase Index Signals N-5

1 Play back the beginning of the picture to be erased by index scan or index search.
2 Within approximately 10 seconds, while the tape is being played back, press the ERASE button.
When the index signal is erased while index scanning, the index scan is resumed.
When the index signal is erased while index searching, normal playback is begun.

Notes on erasing the index signal

- Press the ERASE button more than 2 seconds after the playback starts.
- If the safety tab on the cassette is slid out, the index signal cannot be erased.
- While an index signal is being erased, the recorded sound cannot be heard and a black bar appears at the bottom of the playback picture.
However, recorded signals are not affected.
- The index signal marked by a VCR such as the EV-S900 series can be detected with this unit but cannot be erased.
The index signal marked by this unit can be detected with a VCR such as the EV-S900 series but cannot be erased.
- When the audio is dubbed in the portion where the index signal is marked, the index signal may be erased.

TV Program Recording

The following connections make both TV program viewing/recording and tape playback possible.

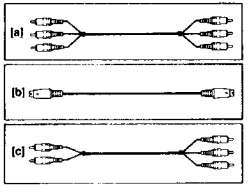
Combination of the Equipment to be Used

Connection example 1 (page 172)
To connect the VCR without input selector.

Connection example 2 (page 174)
To connect the VCR with an input selector

Connecting Cables O-1

O-1

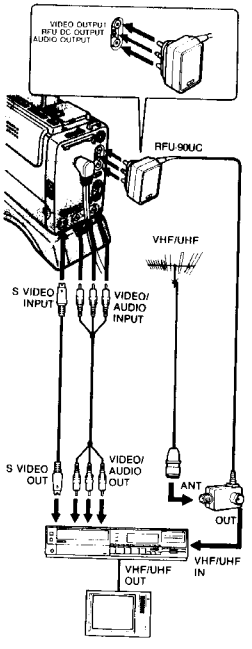


- For antenna cable connections, use 75-ohm coaxial cables.
- For video/audio connection, use the supplied AV cable, connecting cord with S connectors or an optional audio/video cable to match the connectors on the equipment to be connected.
  [a] Supplied AV cable
  [b] Supplied connecting cord with S connectors
  [c] Connecting cable for connecting with monaural equipment, like Sony VMC-910MS/920MS (not supplied)

Notes

- When the conventional 8 mm cassette is used, the picture cannot be recorded in the Hi 8 mode.
- When the equipment is connected to the VIDEO INPUT and S VIDEO INPUT jacks, the signals from the S VIDEO INPUT jack take precedence.
- When the equipment is connected only to the VIDEO INPUT jack, the signals cannot be output from the S VIDEO OUTPUT jack.

O-2



Connection Example 1 O-2

To connect the VCR without input selector

Connections

1 Connect the equipment as shown in the illustration.
When the VCR is equipped with the S video output connector, connect the S VIDEO INPUT on this unit to the S video output with the supplied connecting cord with S connectors.
2 Select the channel selector of the RFU adaptor to either VHF channel 3 CH or 4 CH which is not active in your area.

TV program recording
Disconnect the RFU adaptor.

1 Turn on the VCR and TV.
2 While pressing the small button, set the POWER switch on the CCD-V5000 to VTR.
3 Select the channel for the VCR on the TV.
4 Select the TV channel to be recorded on the VCR.
5 Insert a cassette into the CCD-V5000 and slide the ● REC switch.
Recording will start.

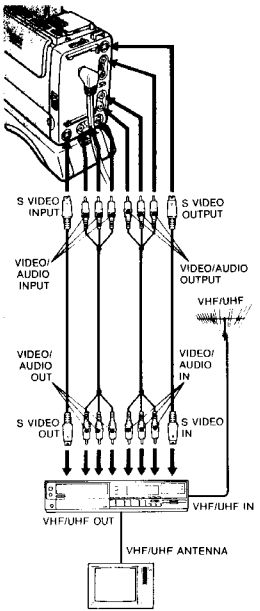
To view another TV program while recording
Set the TV/VTR select button on the VCR to TV and select the desired program on the TV.

Playback
Connect the RFU adaptor.

1 Turn on the TV.
2 While pressing the small button, set the POWER switch on the CCD-V5000 to VTR.
3 Select the channel for the VCR on the TV.
4 Insert a cassette into the CCD-V5000 and press the ▷ button. Playback will start.
The sound is monaural.

TV Program Recording

[O·3]



Connection Example 2 [O·3]

To connect the VCR with an input selector

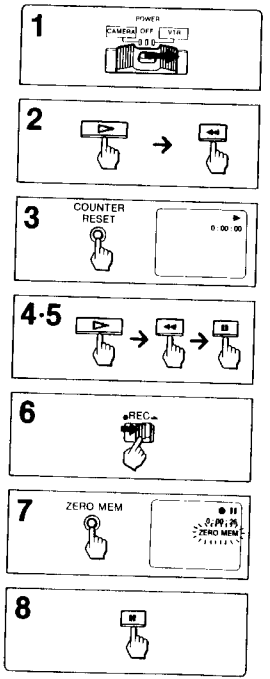
Connections
Connect the equipment as shown in the illustration.
When the VCR is equipped with the S video output/input connectors, connect the S VIDEO INPUT/OUTPUT on this unit to the S video output/input with the supplied connecting cord with S connectors.

TV program recording
1 Turn on the VCR and TV.
2 While pressing the small button, set the POWER switch on the CCD-V5000 to VTR.
3 Select the channel for the VCR on the TV.
4 Set the input selector to TUNER, the TV/VTR select button to VTR and select the TV channel to be recorded on the VCR.
5 Insert a cassette into the CCD-V5000 and slide the ● REC switch.
Recording will start.

To view another TV program while recording
Set the TV/VTR select button on the VCR to TV and select the desired program on the TV.

Playback
1 Turn on the VCR and TV.
2 While pressing the small button, set the POWER switch on the CCD-V5000 to VTR.
3 Set the input selector on the VCR to LINE and select the channel for the VCR on the TV.
4 Insert a cassette into the CCD-V5000 and press the ▷ button. Playback will start.

[O·4]



Insert Recording

To Insert a Picture or a TV Program from Another VCR [O·4]

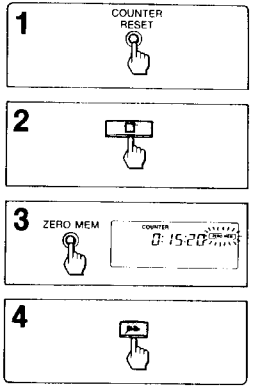
Monitor the picture being inserted on the viewfinder screen.

1 While pressing the small button, set the POWER switch to VTR.
2 Locate the point on the tape where the insert should end by pressing the ◀◀ or ▶▶ button during playback.
3 Display the counter in the display window and press the COUNTER RESET button.
The counter is reset to zero.
4 Press the ◀◀ button during playback to rewind the tape a little further than the point where the insert should begin.
5 Release the ◀◀ button to resume playback and press the II button at the insert starting point.
6 Slide the ● REC switch in the arrow direction to set the unit to recording pause mode.
7 Press the ZERO MEM button.
The insert ending point is stored in memory.
8 To start recording, press the II button.

The insert recording will stop automatically near the counter zero point.

To cancel ZERO MEM mode
Press the ZERO MEM button so that the ZERO MEM indicator disappears.

O-5



Use of the Tape Counter

During recording or playback, the digits on the counter indicate the actual recording or playback time.

To Index the Whole Tape

Press the COUNTER RESET button at the beginning of the tape so that the counter shows "0:00:00". By noting the counter reading at a particular point, you can easily find that point later by referring to the tape counter.

Notes on the counter

- The counter reading and the point of the tape may not correspond exactly. Use the counter as a guide.
- The counter does not operate for a blank, unrecorded portion of a tape.
- There will be a time lag of several seconds on the counter reading after repeated fast-forward and rewind operations.
- There will be also a time lag of several seconds when the tape recorded in LP and SP modes mixed or the tape having a blank portion between the recorded portions is played back.

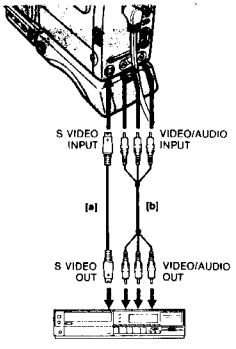
To Return to a Pre-registered Point O-5

1 During recording or playback, press the COUNTER RESET button at the point you later want to locate.
2 Press the ■ button when the recording or playback has finished.
3 Press the ZERO MEM button. The "ZERO MEM" indicator will blink in the display window.
4 Press the ▶▶ or ◀◀ button.
The tape will be rewound or sent forward and stop automatically when the counter reaches approximately zero.

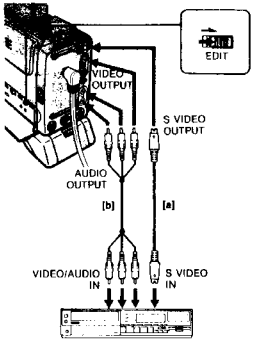
Notes on ZERO MEM button

- The ZERO MEM button does not function during recording or playback mode.
- Be sure to press the ZERO MEM button when the tape is stopped.
- The ZERO MEM mode is cancelled automatically once the tape is rewound or sent forward to zero.

P-1



P-2



Tape Editing

To edit a home movie tape, you will need another VCR or another video camera recorder.

To Edit from Another VCR P-1

1 While pressing the small button, set the POWER switch on the CCD-V5000 to VTR.
2 Start playback on another VCR.
3 Slide the ● REC switch on the CCD-V5000.

To Edit onto Another VCR P-2

1 While pressing the small button, set the POWER switch on the CCD-V5000 to VTR and turn on the other VCR.
2 Slide the EDIT switch on the CCD-V5000 in the direction of the arrow.
3 Set the input selector on the VCR to LINE.
4 Press the ❚❚ button on the CCD-V5000 during playback at the point where you want to start recording.
5 Press the record button on the other VCR, pressing the ❚❚ button.
6 Release the ❚❚ buttons on both units. Recording will start.

[a] When the VCR or video camera recorder is equipped with the S video output/input connector, connect the S VIDEO INPUT/OUTPUT on this unit to the S video output/input with the supplied connecting cord with S connectors.
[b] When the VCR to be used is a monaural type, use a commercially available audio/video connecting cable like Sony VMC-910MS/920MS.

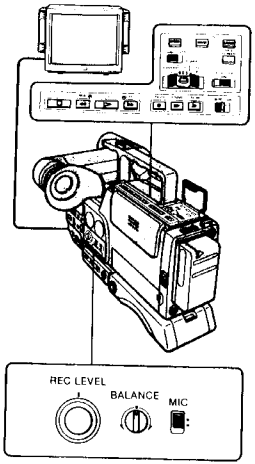
Tape Editing

After editing, turn off both units and be sure to slide the EDIT switch in the reversed direction to the arrow.

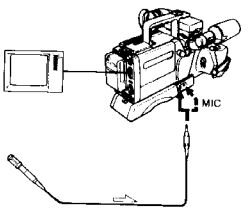
To cut off an unnecessary portion
Press the ❚❚ button on the recorder at the beginning of the unnecessary portion. Release it where you want to resume recording.

Function of the EDIT switch
Slide this switch in the direction of the arrow (ON) whenever you edit tapes. Signal loss that results from tape-to-tape transfer will be reduced, achieving more accurate signal transfer.
When recording or playing back normally, keep this switch in the reversed direction to the arrow (OFF).

Q-1



Q-2



To Dub the Audio Signals

Any desired music or narration can additionally be recorded on the PCM track, while the picture and sound pre-recorded on the standard track are not affected.
Monitor the picture on the TV. Q-1

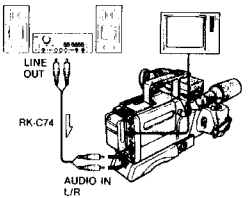
Example 1: To dub the signals from the microphone(s) Q-2

Operation
1 Turn on the power of the TV and select the channel for the recorder or video input.
2 While pressing the small button, set the POWER switch to VTR.
3 Press the ▷ button.
4 Decide where the audio dubbing is to start, and press the ❚❚ button.
5 Slide the AUDIO DUB button in the direction of the arrow.
6 Set the MIC switch to AUTO.
The recording level will be adjusted automatically.
7 Press the ❚❚ button to release pause mode and start dubbing.

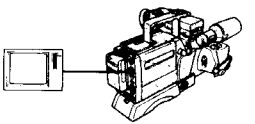
To adjust the recording level manually
Set the MIC switch to MANU in step 6 and adjust the volume and balance with the REC LEVEL control and BALANCE control.
(See page 86.)

Notes
- If the microphone is connected to the MIC R jack and the POWER switch is set to VTR, noises will be recorded.
To avoid it, connect the microphone to the MIC L jack.
- When the POWER switch is set to CAMERA and +VTR switch is slid in the direction of the arrow, the sounds from the built-in microphone will be recorded on the L channel of the PCM track.

Q-3



Q-4



Example 2: To dub the signals from the audio system Q-3

Use a commercially available audio connecting cable like Sony RK-C74.

Operation
1 Turn on the power of the TV and select the channel for the recorder or video input.
2 While pressing the small button, set the POWER switch to to VTR.
3 Press the ▷ button.
4 Decide where the audio dubbing is to start, and press the ❚❚ button.
5 Slide the AUDIO DUB button in the direction of the arrow.
6 Adjust the volume and balance with the REC LEVEL control and BALANCE control.
7 Press the ❚❚ button to release pause mode and start dubbing.

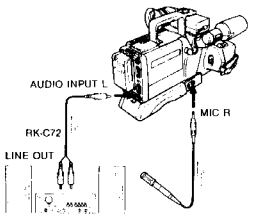
Note
When the microphones are connected to the MIC jacks, the sounds from the audio system cannot be dubbed.

Example 3: To dub the signals with the built-in stereo microphone Q-4

Operation
1 Turn on the power of the TV and select the channel for the recorder or video input.
2 While pressing the small button, set the POWER switch to CAMERA.
3 Slide the +VTR switch in the direction of the arrow.
4 Slide the STANDBY switch up.
5 Press the ▷ button.
6 Decide where the audio dubbing is to start, and press the ❚❚ button.
7 Slide the AUDIO DUB button in the direction of the arrow.
8 Set the MIC switch to AUTO.
The recording level will be adjusted automatically.
9 Press the ❚❚ button to release pause mode and start dubbing.

To adjust the recording level manually
Set the MIC control to MANU in step 7 and adjust the volume and balance with the REC LEVEL control and BALANCE control.
(See page 86.)

Q-5



Example 4: To dub the signals from the microphone and the audio system Q-5

Connect the audio system to the AUDIO INPUT L jack of this unit using a commercially available audio connecting cable like Sony RK-C72 and the microphone to the MIC R jack.

Operation

1 Turn on the power of the TV and select the channel for the recorder or video input.
2 While pressing the small button, set the POWER switch to VTR.
3 Press the ▷ button.
4 Decide where the audio dubbing is to start, and press the ❚❚ button.
5 Slide the AUDIO DUB button in the direction of the arrow.
6 Set the MIC switch to AUTO.
The recording level of the microphone will be adjusted automatically.
7 Adjust the volume and balance of the audio system with the REC LEVEL control and BALANCE control.
8 Press the ❚❚ button to release pause mode and start dubbing.

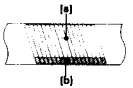
To adjust the recording level of the microphone manually
Set the MIC switch to MANU in step 6 and adjust the volume and balance with the REC LEVEL control and BALANCE control.

To stop dubbing momentarily
Press the ❚❚ button.

To set the recorder in the playback pause mode after releasing the dubbing pause mode
Slide the AUDIO DUB button in the direction of the arrow.

To stop dubbing
Press the ■ button.

Q-6



To Dub the Audio Signals

When an external microphone or audio system is connected, the sound will be recorded as follows.

Track / Connection		PCM track: L (left) channel	PCM track: R (right) channel
L and R		external L microphone	external R microphone
Q-2 Ex. 1	L	external L microphone	external L microphone
	R	no recorded	external R microphone
Q-3 Ex. 2		stereo system L	stereo system R
Q-5 Ex. 4		stereo system	external microphone

Enlarged tape Q-6
[a] Standard track: Sounds on this track remain.
[b] PCM track: The dubbed sounds are recorded on this track.

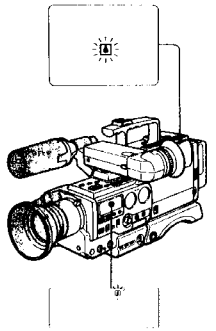
About the picture during dubbing
- At the starting of the dubbing, upper of the picture may be distorted.
The recorded picture will not be affected.
- During dubbing or in the dubbing pause mode, a black band will appear in the screen. The recorded picture will not be affected.

To monitor the sounds during dubbing
Set the AUDIO MONITOR switch as follows.
PCM: The sounds to be dubbed can be monitored.
MIX: The sounds only on the PCM track can be monitored.
Hi-Fi: The sounds to be dubbed **cannot** be monitored.

Notes on dubbing
- The prerecorded sounds on the PCM track will be erased by dubbing.
- The dubbed sounds cannot be played back by the VTR without the PCM recording or playback functions.

Notes on Moisture Condensation

R-1



If the unit is brought directly from a cold to a warm location, moisture may condense inside the unit, on the surface or the tape or on the lens. In this condition, the tape may adhere to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the unit is furnished with moisture sensors.

Moisture is Present inside the Unit When: R-1

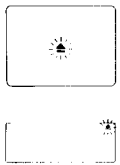
The ⏏ indication blinks inside the viewfinder or in the display window. No function except for cassette ejection will work.

Eject the cassette if present, and turn off the unit and leave it with the cassette holder open at least for one hour.

The unit can be used again if the ⏏ indication does not appear when the power is turned on again.

If Moisture is Present on the Surface of the Tape R-2

R-2



When the tape is inserted and a tape transport button is pressed, the ⏏ indication blinks inside the viewfinder or in the display window. No function except for cassette ejection will work.

Eject the cassette and let the unit and the cassette sit at least for one hour.
The cassette can be used again if the ⏏ indication does not appear when the cassette is inserted and a tape transport button is pressed.

If Moisture Condensation Occurs on the Lens

There are no caution indications, but the lens becomes dim. Turn off the power and leave the unit unused at least for one hour.

Precautions

Operation

- Operate the unit on 6.0V (battery pack)/7.5V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Do not hold the unit by the viewfinder.
- Avoid rough handling or mechanical shock to the unit. Be particularly careful of the lens.
- Do not apply excessive force to the microphone.
- Avoid shooting the same object for a long period of time (for example, using as a lookout camera or pointing the camera directly at the sun or other bright light sources) as this will damage the color filter inside the camera and may cause a poor picture quality.
- Remove and store video cassettes after recording or playbaack.
- Do not wrap up the unit and operate it because heat may build up internally.
- Avoid using and storing the recorder in the following locations.
  - —Locations susceptible to vibration.
  - —Locations exposed to strong magnetic fields.
  - —Locations near TV or radio transmitters where strong radio waves are generated.
- Do not put the unit on the sand.

Care

- Store cassettes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.
- When the unit will not be used for a long period of time, periodically turn on the power, operate the camera section and recorder section and play back a tape for about three minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on them, remove them with a soft cloth. Clean the recorder body with a dry, soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish. For protection, keep the lens cap on the lens when not using the camera.

Using Your Recorder Abroad

Each country has special TV color broadcast and electricity systems. Before using your recorder abroad, check the following points.

Differences in color systems
If you prepare fully charged battery packs and the AC power adaptor which can be used in all areas with the local power supply of 100V-240V, you can use your recorder in any country. You can monitor the playback picture on the viewfinder screen. However, to monitor the playback picture on a TV, the TV must be based on the NTSC system and have the video/audio inputs.

NTSC system countries
Bahama Islands, Canada, Central America, Japan, Korea, Mexico, Taiwan, the Philippines, U.S.A., etc.

PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Great Britain, Holland, Hong Kong, Italy, Kuwait, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, West Germany, etc.

SECAM system countries
Bulgaria, France, Hungary, Iran, Iraq, Monaco, Poland, the Soviet Union, etc.

Color Temperature and White Balance

The color temperature indicates a property of light and is measured in K (Kelvin). If increases as the light source gets bluer and decreases as the light source gets redder. It has no direct relationship with brightness.
The camcorder automatically adjusts the white balance within the range shown below.

Color temperature (K)		Light source
⇧	10.000	Clear sky
	8.000	Slightly overcast
Blue ⇕	7.000	Cloudy rainy
	6.000	Fluorescent lamp (daylight)
White	5.000	Direct suntlight
		Fluorescent lamp (white)
	4.000	After/before 1 hr.
⇕	3.500	Fluorescent lamp (off white) Studio lamp Halogen lamp
	3.200	
	3.000	Tungsten lamp
Yellow ⇕	2.500	After/before 30 min.
Red ⇩	2.000	Sunrise/ sunset
		Candle light

Specifications

System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Standard: Rotary head, FM system (2 channels) PCM: PCM system (2 channels)
Video signal	NTSC color, EIA standards
Usable cassette	8 mm video format cassette
Tape speed	SP: Approx. 1.43 cm/sec. LP: Approx. 0.72 cm/sec. (playback only)
Recording time	SP mode: 2 hours (E6/P6 – 120)
Playback time	SP mode: 2 hours LP mode: 4 hours (E6/P6 – 120)
Fast forward/rewind time	Approx. 7 min. (E6/P6 - 120)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (black and white)
Lens	Combined 8 × power zoom lens f = 11 – 88 mm, F1.4 with macro Filter diameter: 52 mm
Auto focus system	TTL
Color temperature	Auto: One push white balance INDOOR 3,200 K OUTDOOR 5,800 K
Minimum illumination	2 lux (F1.4)
Illumination range	2 lux – 100,000 lux (0.2 – 9,294 footcandles)
Recommended illumination	More than 100 lux (9.3 footcandles)
Aperture correction	Automatic, manual (variable)

PCM

Sampling frequency	31.5 kHz
Audio frequency	20 Hz – 15 kHz
Dynamic range	More than 85 dB
Wow and flutter	Less than 0.005% RMS

Input and output connector

Video output	Phono jack (1), 1 Vp-p, 75 ohms unbalanced, sync negative
S video output	4-pin mini-DIN (1) Luminance signal: 1 Vp-p, 75 ohms, unbalanced, sync negative Chrominance signal: 0.286 Vp-p, 75 ohms, unbalanced
Audio output	Phono jacks (3: L, R and monaural), −7.5 dBs, at output impedance less than 2.2 kilohms
RFU DC OUT	Special minijack (1), 5V DC
Video input	Phono jack (1), 1 Vp-p, 75 ohms, unbalanced, sync negative
S video input	4-pin mini-DIN (1) Luminance signal: 1 Vp-p, 75 ohms, unbalanced, sync negative Chrominance signal: 0.286 Vp-p, 75 ohms, unbalanced
Audio input	Phono jacks (2: L and R), −7.5 dBs, input impedance more than 47 kilohms
Headphones jack	Stereo minijack (1), 8-ohm impedance
Remote jack	Stereo mini-minijack (1)
Microphone jacks	External microphone jacks: phone jack (2), −66 dBs low impedance External narration microphone jack: minijack (1), −66 dBs low impedance

General

Power requirements	Battery compartment 6.0 V (battery pack)/7.5 V (AC power adaptor)
Power consumption	12 W (camera recording, DIGITAL EFFECT switch "ON") including the viewfinder
Installation	Vertically, horizontally
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	−20°C to +60°C (−4°F to +140°F)
Dimensions	Approx. 190 × 235 × 430 mm (w/h/d) (7 1/2 × 9 3/8 × 17 in.) including the lens hood
Weight	Approx. 3 kg (6 lbs 10 oz) excluding the battery and cassette
Microphone	Electret condenser microphone × 2 uni-directional stereo type
Narration microphone	Electret condenser microphone, omni directional monaural type
Accessories supplied	See page 8.

Design and specifications are subject to change without notice.

Trouble Indications

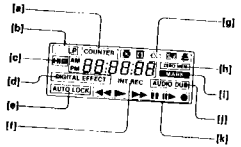
If an indication blinks in the viewfinder screen or a caution lamp on the main unit blinks, check the following table.

slow blinking fast blinking

	Symptom	Cause	Corrective actions
Camera/ VTR		The battery is weak.	Prepare a charged one.
		The battery is used up.	Use a charged battery.
Camera		The tape is at its end.	Use a new tape.
		The tape is near its end.	Prepare a new one.
		No tape is inserted.	Insert a tape.
		The tab on the tape is out (red).	Slide the tab.
		• The battery is removed for more than 1 hour. • Low light • The white balance is adjusted with a suitable other than white.	Adjust the white balance correctly.
Camera/ VTR		Moisture condensation has occurred.	Remove the tape and leave the recorder for at least an hour.
		The gap of the head is clogged.	Clean the head using the Sony V8-25CLH video head cleaning tape.
		Other troubles may occur.	Consult your nearest Sony dealer.
	"AM 12:00:00" blinks for 5 seconds in the viewfinder after setting POWER to CAMERA. In the display window "0:00:00" or bar indication blinks.	The lithium battery is not installed. The lithium battery is exhausted.	Install the lithium battery.
	The current time blinks for 5 seconds in the viewfinder after setting POWER to CAMERA. In the display window the counter, date/time indication blinks.	The lithium battery is weak.	Use a new battery.

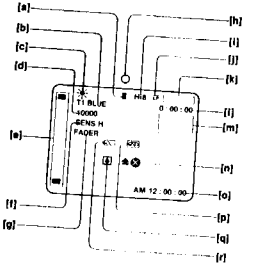
Trouble Indications

Indications in the Display Window



[a] Time/date/counter indication
[b] Tape speed indication
[c] High eight mode indication
[d] DIGITAL EFFECT indication
[e] AUTO LOCK indication
[f] Indicates during interval recording.
[g] Caution indications
[h] ZERO MEM (memory) indication
[i] Lights when the index signal is marked.
[j] Indicates during audio dubbing.
[k] Shows the VCR operation mode.

Indications inside the Viewfinder



[a] Lights when the focus is adjusted manually
[b] Title number and color indication
[c] Lights when the white balance is adjusted manually.
[d] Shutter speed indication
[e] Lights when the iris is controlled manually
[f] Lights when the SENS button is pressed
[g] FADER/OVERLAP indication
[h] Camera recording lamp
[i] High 8 mode indication
[j] Indicates the playback mode (LP)
[k] In the VCR operation mode, this indicates the tape transport function.
[l] Tape counter
[m] ZERO MEM/INDEX mode/digital picture mode indication
[n] Caution indication
[o] Date/time
[p] Tape indication
[q] Dew indication
[r] Battery indication

oubleshooting

u think you have a problem, double-check before calling the serviceman.
may have overlooked something relatively simple!

Symptom	Cause	Procedure
power will not turn	The battery is not attached.	Attach the battery.
	The battery is exhausted.	Use a new battery.
	The AC power adaptor is not connected to a wall outlet.	Connect the adaptor to a wall outlet.
e START/STOP button es not operate.	The tape is affixed to the drum.	Remove the cassette with the cassette eject button.
	The tape is at its end.	Rewind the tape or use a new one.
	The POWER switch is set to VTR.	Set it to CAMERA.
	The tab on the cassette is out (red).	Use a new cassette or slide the tab.
he tape does not move vhen a tape transport outton is pressed.	POWER switch is set to CAMERA or OFF.	Set it to VTR.
	The tape is at its end.	Rewind the tape or use a new one.
The power turns off.	While being operated in the CAMERA mode, the recorder has been in the pause mode for more than 5 minutes.	Slide down the STANDBY switch, and slide it up again.
	The battery is exhausted.	Use a charged battery.
A vertical band appears when a subject such as lights or a candle flame is shot against a dark background.	The contrast between the subject and background is too high; the camera is not malfunctioning.	—
The battery pack is quickly discharged.	The ambient temperature is too low.	—
	The battery pack has not been charged fully.	Charge the battery pack again.
The cassette cannot be removed from the compartment.	The battery is exhausted.	Use the charged battery or the AC power adaptor.
The auto focusing function does not work.	The AUTO LOCK switch is not set to AUTO LOCK.	Set the AUTO LOCK switch to AUTO LOCK.
	Shooting conditions are not suitable for auto focusing operation. (See page 90.)	Set the AUTO LOCK switch to the lower position and set the FOCUS button to MANU to adjust the focus manually.
The color of the playback is not appropriate.	The AUTO LOCK switch is not set to AUTO LOCK.	Set the AUTO LOCK switch to AUTO LOCK.
	Shooting conditions are not suitable for auto white balance operation. (See page 96.)	Set the AUTO LOCK switch to the lower position and set the WHT BAL control to the appropriate position to adjust the white balance manually.
The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.
The playback picture is not clear.	The EDIT switch is set in the direction of the arrow.	Set the EDIT switch in the reversed direction of the arrow.
	The channel for the VCR is not adjusted on the TV.	Adjust the TV.
The video heads may be contaminated.		Clean the heads using the Sony V8-25CLH video head cleaning cassette. For details on cleaning, refer to the instructions furnished with the cleaning cassette.
The picture is noisy.	Moisture condensation has occurred. (See page 192.)	Remove the cassette and leave the unit for at least an hour.
	• The AUTO LOCK switch is not set to AUTO LOCK. • Shooting condition bs are not suitable for auto white balance operation.	• Set the AUTO LOCK switch to AUTO LOCK. • Adjust the white balance manually. (See page 96.)
No function except for cassette ejection works.		
The auto white balance function does not work.		